

Municipal Journal

Volume XXXVII

NEW YORK, DECEMBER 24, 1914.

No. 26

THE STORAGE BATTERY FOR ELECTRIC PLANTS

Advantages of Use in Lighting and Other Plants and Illustrations of Such Use—Carries Peak Loads—Furnishes Day Service When Dynamo is Not Running—Losses of Energy

By J. F. SPRINGER.

The storage battery or secondary is coming to be appreciated as a very important adjunct in central station operation. Its valuable service in this connection is not so much as the sole or the principal supplier of current but rather as a means of carrying certain peak loads without increase of generator equipment, of affording a reliable and very satisfactory substitute for a duplicate stand-by installation, and of preventing a large part of the usual waste of station capacity. It performs duties similar to those accomplished by the reservoir in a water supply system.

A primary battery is an original source of current which it supplies at the expense of its parts. A storage battery also supplies current, but this energy is representative of other current previously forced into it as a charge. There are in the individual cells positive plates and negative plates and a liquid in which both are immersed. When a direct current from an outside source is passed through the cells, a chemical change is wrought in the positive plates and also in the negative ones. Thus in one type of cell the iron oxide of the negative plate loses oxygen and the nickel hydrate of the positive plate gains oxygen. The liquid of immersion remains essentially the same. The cell is now a proper source of direct current electricity and may be used as such. All that is necessary to get current out is to connect the poles by a suitable conductor, just as with an ordinary cell. The cells may be connected up *in series*, the result being a battery whose amperage is that of the individual cell and whose voltage is the sum of the individual voltages. Or the cells may be connected *in parallel*, with the result of adding amperages and leaving voltage unchanged.

There are certain electric losses connected with storage batteries which must be taken into account. In the first place, there is a loss of the charge that goes on slowly with the lapse of time. After a period—a very considerable one, though—the battery will become dead. A general idea of the gradual character of this loss may be gotten from the fact that storage battery lighting plants for cottages may be left charged at the end of one season and used with but slight recharging at the beginning of

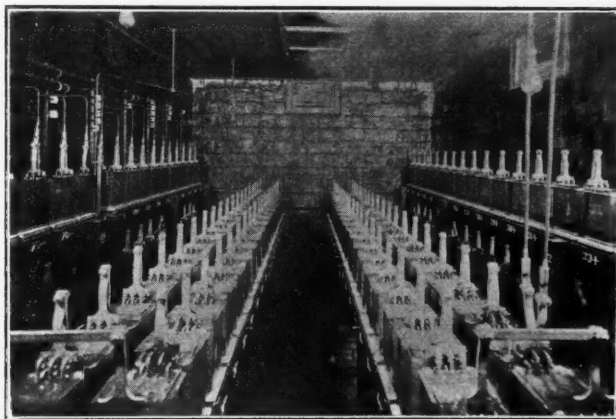
the next season. Another loss—and this is the largest one—is the immediate one expressed in the statement that one cannot recover all of the energy put into a battery. Thus, the energy from a direct current generator capable of maintaining lamps totalling 10,000 candle power will, after having been first passed through a storage battery, maintain lamps totalling only about 8,000 candle-power with the lead battery, and about 6,000 candle-power with the iron-alkaline type. But this kind of a loss is one with which engineers are familiar in transforming one kind of energy into another—as, for example, when the energy of the steam engine is transformed into electric energy. It is the price we pay to get energy in the form in which we want it.

"A storage battery when discharged at a high rate will not have as great a capacity as if discharged at a low rate. The full capacity can, however, be obtained if, after the battery has given out all it can at the high rate, the discharge current is reduced to a low rate."

Having said these objectionable things, but which are on the whole perhaps nothing more than what we have in connection with other energy systems, let us pass to the advantages. Current need not be charged into the battery

in a single operation. It may be put in with a great deal of irregularity; there may be numerous interruptions. A ragged current may be charged; when it reappears, it will be perfectly smooth and even. The charging may be done at convenience; and the withdrawals may also be made at convenience. These possibilities are of enormous value. They supplement those of the dynamo, whose current must ordinarily be used instantly or not at all. With the dynamo alone there must necessarily be a great deal of waste due to operation for a great part of the time at a low load.

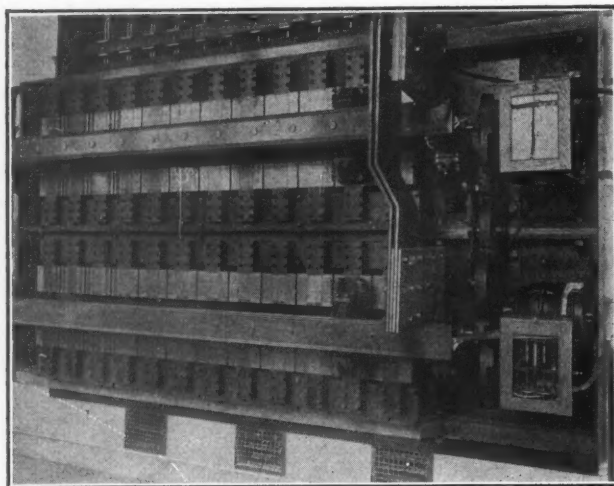
Another advantageous quality of the storage battery is that by virtue of which it may be instantly put into service. There is no waiting or hesitation. Again, we may withdraw not only at various times, but at widely fluctuating rates. The rate of discharge may also be changed with great rapidity. The foregoing considerations sum up a total of extremely valuable qualities that is serving



STORAGE BATTERIES OF MISHICOT, WIS., E. L. CO.
132 Cells, Type E-5, Chloride Accumulator.

to impress electrical engineers with the fact that the storage battery has a field of its own which it is admirably adapted to occupy. When we add to the list the capability that at least certain have—the capability of being operated simultaneously with a dynamo or of being charged at the same time that the dynamo is being used also for other purposes (as a reservoir is filled with the surplus from a pump whenever fluctuating consumption is low)—we have added something to still further enhance the practical usefulness of storage batteries.

The upkeep of the batteries is rather a minor consideration. The best varieties last for ten years. The positive and negative plates are not actually consumed. They are simply used as a basis of activity. Either plate is alternately deprived of or enriched by a chemical element through the charging and discharging operations. The electrolyte, as the liquid of immersion is termed, is left substantially unchanged in composition. Batteries may be injured by careless treatment. Thus, it is better that a battery should not be used to the point of exhaustion before being recharged.



TEN THOUSAND AMPERE END CELL SWITCHES IN USE BY THE NEW YORK EDISON CO.

Because of its capabilities for service, the storage battery may be used to carry peak loads. There must be, in order to get the most economical results, an adjustment in respect to capacity between the load, the dynamo equipment and the storage battery plant. Somewhere between the minimum load and the maximum will be a point up to which it will be well for the capacity of the dynamo alone to reach and above which the excess will be advantageously carried by the storage battery. It may be that in a very large percentage of cases this point cannot be determined with exactitude, so that it will be best to provide a region where the functions of dynamo and battery overlap. In either case, there will be a system of peak loads upon whose occurrence both dynamo and battery will cooperate to do the work. Obviously, this means that the dynamo equipment need not be designed or installed in contemplation of carrying these peaks unaided, but only in contemplation of an upper line limiting the dynamo loads. Consequently, the heavy cost of dynamo equipment may be curtailed. Further, the equipment installed will be used within a narrower range of load; and frequently if not generally this will make it possible to operate with increased economy because the operation is confined to the vicinity of the load of maximum efficiency.

The possibility of an arrangement of this character means a good deal to both small and large communities.

However, this broad fact must be borne in mind: If the maximum loads occur only a few times a year, it is possible that an extra dynamo will cover the conditions more economically. But where the fluctuations occur repeatedly and the range is considerable, it will be well to consider the storage battery.

Let us consider a case by way of illustration. The case I bring forth is an extreme one—too extreme to find many duplicates perhaps in the conditions of small towns. And yet, an extreme case will often serve well to emphasize a point. The Michigan Central railroad has for years been operating freight and passenger trains across the Detroit river. Recently the road constructed a double track tunnel, which it is now operating by electricity. Trains going through do so in a few minutes, and generally at considerable intervals. As the tunnel dips down beneath the central part of the river, there is a grade on either side. At times there may be an excessive demand for current due to two heavy trains being simultaneously on the up grade. A little thought will make it clear that the load curve will show repeated high and steep peaks with broad and steep valleys between. This problem has been solved in the following way. The railroad buys alternating current from the Detroit Edison Company. This is passed through motor generator sets which “transform” it into direct current. The trains are operated by this current either directly from the generator sets or indirectly from those sets through the storage battery. The current from the storage battery will ordinarily be current that was in effect pumped into it during the lulls. The railroad takes power from the generator sets up to 800 amperes; beyond this point up to 8,360 amperes, the excess power is taken from the battery; and from this point up to 9,100 amperes, the excess comes again from the generator sets. It will be seen from this case that to meet the maximum loads possible would have required an excessive generating equipment at the central station to take care of them. As it is, the maximum demand to be purchased is sufficient current to operate the motor generator sets at capacity (1,540 amperes).

Whether for any particular group of conditions it would be well to provide for the power demands along the lines of the provisions for the Detroit tunnel is a matter for a calculation in which all the items are given their due weights.

There are many small towns where a set of conditions exists which would not indicate a solution of this character at all, but where the conditions still are such as to make a storage battery an advantageous part of the equipment. Thus, take an average town of 1,000 inhabitants. Ordinarily, it will not be the best economy to run the plant both day and night, and yet a 24-hour service is desired. Patrons find it very awkward to need light in the day and be unable to get it. A day may be cloudy, but there are no lights until 6 p. m. Some patrons want light for dark rooms or occasional use; some want power. Such conditions can often be met in a very satisfactory way by using a storage battery to take care of the light load from midnight to 6 p. m., and the generator to supply current both for the customers and for the battery during the period from 6 p. m. to midnight—probably the only time when it would be run in any event. This heavy current for the short period can often be supplied with great economy because of the increased efficiency of the engines and generators.

Consider a representative case. The town of New Windsor, Md., has a population of 750. The light and water company has a battery installation of 122 cells which have normally a capacity of 120 ampere-hours. The voltage is 220. The generator plant is operated from

dark until 10 p.m. The maximum load about 9 o'clock will be about 42 amperes, 15 of these being due to the charging of the battery. When the generator plant shuts down at 10 o'clock, the load will be about 15 or 20 amperes. It declines sharply until about midnight, when it falls to 2 amperes. It will continue at this level until early morning, when it will rise to 5 or 6 amperes for a brief time. From the time this loads drops off sharply, the demand will be about $1\frac{1}{2}$ amperes until dark. This account represents a fairly typical day. For about 20 hours the load will average somewhere around 3 or 4 amperes. The personal attendance is given during a short period and the dynamo is operated for only a short period. Then for a very long period, neither personal attendance nor generator operation is required. This is a two-wire, direct-current system. The power for operating the dynamo is supplied by a gas-driven engine whose gas is obtained from a producer gas plant. This is an economical arrangement. The president of the company states, however, that even so it would be practically impossible to give a 24-hour or even a 12-hour service without the assistance of the battery. The economical load for the engine occupies too short a period.

A similar case is presented by the town of New Egypt, N. J., having a population of 900. The storage battery has about the same capacity, but the load is different. There is the heavy demand from 6 to 12 at night for the customers and the battery. During the rest of the day, except from noon to 4 p.m., the load is very light indeed. But during the 4 hours of the afternoon, there is a good strong pull for pumping purposes. Nevertheless, the battery of 120 ampere-hours capacity takes care of all loads for the 18 hours from midnight to dark of the following evening.

Allentown, N. J., with a population of 630, also has a 120 ampere-hour battery, which it uses in a similar way to the battery at New Windsor. The little town of Mishicot, Wis., population 700, is supplied by an 80 ampere-hour battery. The voltage is 220. The generator is driven by a water wheel.

LIGHTING RESIDENCE STREETS IN HELENA

Lamp Standards, Lamps and Underground Wiring— Conduits Built in Concrete Curbs—Various Wire Insulations—Costs of Installations

By CHARLES W. HELMICK.

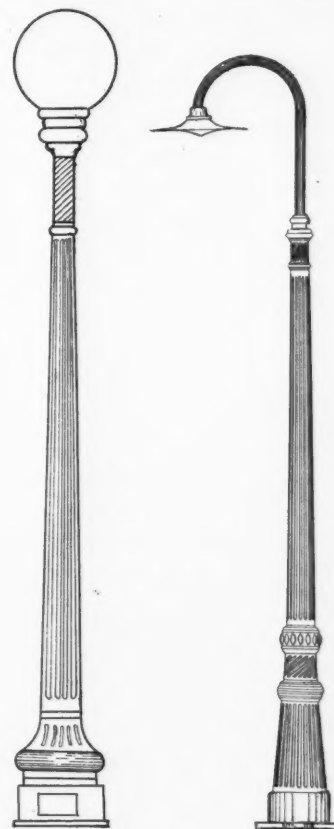
In 1910 the city of Helena, Montana, commenced the installation of a street lighting system which was a radical departure from the open and enclosed ones previously used, inasmuch as incandescent lamps of 40 watts each were to be used in a series, the constant current strength being 6.6 amperes.

The first street upon which this system was installed was Sixth avenue, one of the principal streets leading from the business section of the city to the state capitol. Concrete walks and curbs were constructed at the same time, and in the latter was placed the $1\frac{1}{2}$ -inch fibre conduit through which the insulated conductor was to be drawn.

The electroliers were made of gas-pipes with a cast-iron base which was anchored to a concrete base, 18 inches square and 18 inches deep and moulded at the same time the curbs were made, by four $\frac{3}{4}$ -inch bolts 16 inches in length. The top length of pipe was bent to a radius of 12 inches and to the end of this a fluted reflector was screwed. The lamp proper was 8.5 ft. above the curb. This was found to be too short a distance, and a better

post was designed and used in the later installations of this character. Fifty-two standards were used on this street, one being placed on each street corner and one on each side midway between.

The fibre conduit was placed at the time of constructing the curbs. Three inches of concrete was first placed in the curb forms and upon this the conduit was carefully



LAMP STANDARDS USED IN HELENA.

laid with well connected joints, a waterproof compound being used for this purpose. Connections were made with the bases of the posts with a $\frac{1}{4}$ bend of 15-inch outer radius. In laying the conduit across the street, it was placed in concrete for better protection. Three inches of concrete was first placed in the trench and the conduit was then laid, after which four inches of concrete was placed over the conduit. This was placed at such a depth as not to interfere with any future street paving.

The wiring was to be connected with that of the arc lighting system, which necessarily carried a very high voltage, and the conductor used was a No. 6 B. & S. gauge copper wire, rubber insulated for 3000 volts, which conductor was enclosed in a lead tube for a moisture proof underground conductor. We had no little trouble with this installation during the first six months as, in some unexplainable manner, it became short circuited and ruptured the lead sheathing in several places. This system has now been in operation for four years and we have had no further trouble with it since the repairs were made.

The installation was so satisfactory that residents of other streets petitioned the city council to construct similar systems for them. A much more ornamental standard was designed for the posts using the open lamps with Wheeler fluted shades, and also one which was straight, with the lamp at the top, which was enclosed in a 16-inch globe. The posts with globes are more ornamental, but for street lighting purposes only, the goose neck lamps are far superior. The posts are spaced approximately 125 feet apart, generally staggered instead of being placed opposite each other, as this gives a more

nearly even illumination for the street. The same construction with fibre conduits was used as formerly, but as the General Electric Co. had in the meantime developed a 2 kilowatt and a 4 kilowatt transformer, thereby greatly reducing the potential of the current, the wiring system was changed. We now use a cambric insulated wire for about 3,000 volts, but it is covered with a double weather-proof braid instead of with lead, which greatly reduces the cost of wiring. Where the number of lamps on a circuit is 50 or less a 2 kilowatt transformer is used. Where there are more than 50 and up to 100, a 4 kilowatt one is used. The constant current is still 6.6 amperes.

This class of construction has been in use three years and it has proven eminently satisfactory. No breakdowns have occurred and we have 1200 lamps on the various streets, with another district having 400 lights nearly completed. The construction was changed in this district, inasmuch as the curbs and walks were constructed several years ago, and the fibre conduit was placed in a trench in the parked area and was not laid in concrete. The specifications prescribed a No. 6 wire, cambric insulated for 1000 volts. This seems a very light insulation for underground construction, and I scarcely think such will be called for again.

Payments for all work is made with special improvement district bonds, bearing 6 per cent interest and issued against the real property within the boundaries of the district. These bonds mature in from five to twenty years, as the council may provide, this being governed largely by the residents of the district. It is the prevailing opinion here that 10 years should be the maximum limit, as otherwise the system may become antiquated before the bonds are fully paid. It would seem that a five year bond is ample time for all purposes.

The cost of installation of a system as above described is reasonable. The contract price for the installation of the latest system containing 400 lamps, including all labor and material, is about \$25,500, or an average of \$63.75 per post. The cost of installation of the Ninth avenue district with 66 lamps was slightly over \$3,700, or \$56 per post. The difference in cost is largely due to the fact that in the installation of the latter, the fibre conduit was built in the curb as the latter was constructed, while in the former it was necessary to dig trenches for the conduit as well as the extra holes for the bases.

One other district will probably be completed next year and when this is done practically the whole of the residential section of Helena will be well lighted. This is a great convenience to the residents, and furthermore it is an additional safeguard, as it is fully as good as and less costly than additional policemen. The Helena Light and Railway Company furnishes electricity to Helena for street lighting at 4 cents per k. w. hour, or \$6 per lamp per year.

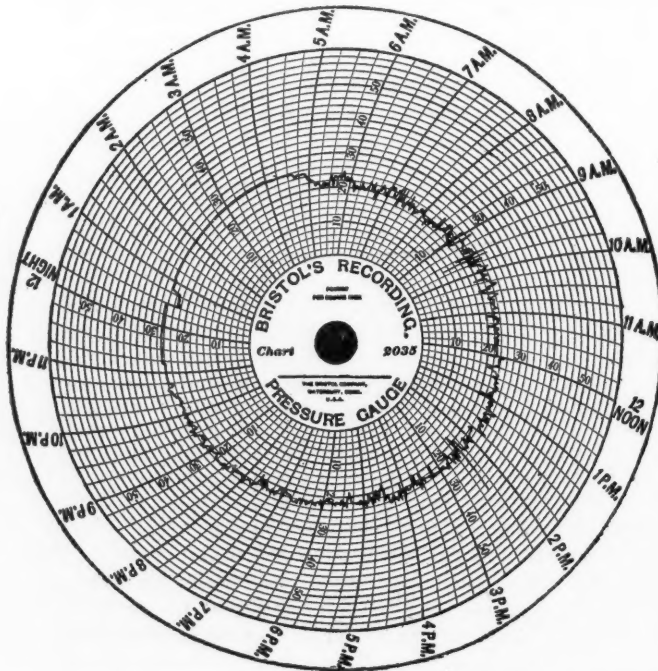
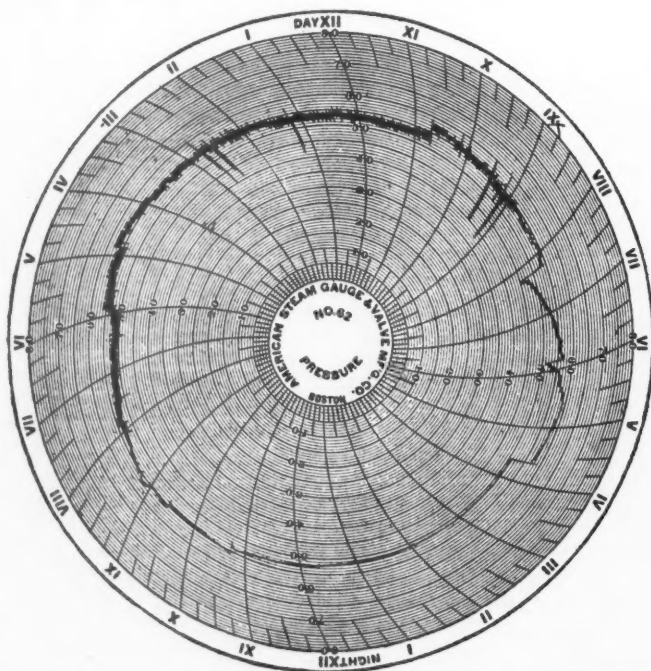
CHICAGO WATER WORKS NOTES

Pressure Reducing Valves Diminish Consumption One Fourth—Trench Excavating by Machine Cheaper Than by Hand—Testing Mains

In his annual report as superintendent of the Water Pipe Extension Division of the Department of Public Work of Chicago, H. L. Lucas gives some interesting figures of cost of trenching for pipe by hand and by machine excavator, the use of pressure reducing valves and testing of mains as laid. These parts of his report were as follows:

PRESSURE REDUCING VALVES.

A very important installation was that of two pressure regulating valves which were installed in Jefferson Park during the past year. One of these valves is located at Milwaukee avenue and Lawrence avenue and the other at Milwaukee avenue and 56th avenue. The necessity for these valves arose from the fact that the territory known as Jefferson Park was supplied entirely from the 12-inch main in Milwaukee avenue which leads from the Jefferson Park booster station to Norwood Park. The pressure on this 12-inch main is maintained at about 60 lbs. per square inch in order to deliver water at sufficient pressure to the higher elevation in Norwood Park. This high pressure on the supply mains in Jefferson Park was the cause of a large increase in consumption and, in order to reduce the consumption in this territory, the pressure regulating valves were installed at the above named locations. These valves were then adjusted so that the pressure on the system beyond the valves was 22 lbs. per square inch. From tests made on October 29, 1913, the water saved by the use of these regulators was found to be at the rate of 121,000 gallons for 24 hours. This



TWENTY-FOUR-HOUR PRESSURE RECORDS, WITHOUT AND WITH CONTROL OF PRESSURE BY PRESSURE REDUCER.

is undoubtedly a very conservative figure for the saving effected by these valves. These tests were made at 3 P. M. and at a season of minimum wastage. It can be safely assumed that these same tests, if made during the summer months, would show a very much higher saving. From these tests, and others made in this vicinity, it is estimated that the consumption of the territory in question was 770,000 gallons per day, so that these regulating valves have shown a saving in consumption of approximately 15 to 30 per cent. The action of these valves has been found to be such that, in cases of great demand, such as a fire requiring the use of several fire hydrants, the valves open fully, giving the full capacity of the pipes on which they are installed.

Accompanying this report are pressure charts, one from the gauge at Jefferson Park pumping station showing an average pressure of about 55 lbs., and the other one from gauge at Hook and Ladder Company No. 23, located within the district controlled by the regulating valves, showing an average pressure of about 22 lbs. These two records were made September 17, 1913, and show the positive operation of these regulators.

These valves were installed as an experiment, having never been used in the Chicago distribution system before. The results attained were so highly satisfactory that it is believed further advantageous use of such valves can be made with profit.

TESTING MAINS.

Water mains laid in Chicago are tested after they are laid, a pump driven by a gasoline engine being used for that purpose and the mains subjected to 100 pounds hydraulic pressure. All of the mains laid by contract last year were so tested and such of the jobs done by the district forces as could be reached. The testing developed 43 joint leaks, 4 split pipes, 4 broken valves and several fire hydrants leaking. The test pump was hauled from job to job by team and the distances between them was often so great that not more than one job could be reached in a day. It was therefore recommended that the pump be mounted on a light auto truck.

WATER PIPE TRENCHING BY MACHINE.

In July a trenching machine was purchased from the F. C. Austin Drainage Excavator Company for \$7,350. A special gang was organized known as Construction Gang A to lay pipe with this machine. Mains were laid in various parts of the city, the jobs being picked out

wherever the machine could be used to advantage. A comparison of the cost of the work done by hand labor and the cost of labor by machine was made for the sixty days probation period, showing a very much lower cost for the machine work.

TABULATION OF COST OF PIPE LAID BY HAND DURING 60 DAYS.—JULY 20 TO SEPT. 20, 1913.

Location	Size	Length	Cost of Labor and Teams
57th St., Wentworth to Princeton.....	6	600	\$600.60
Buena Ave., Kenmore Ave., west.....	6	117	180.41
Forest Ave., Greenleaf Ave. to Lunt Ave.	6	450	206.40
Carmen Ave., 51st Ave., east.....	6	350	180.65
Avondale Ave., 876 ft. w. of Edmonds west	6	250	71.22
Higgins Ave., 850 ft. W. of 56th Ave. west	6	400	276.94
Washington Boul., Prairie to Waller..	6	300	430.32
41st Ave., 32nd St. south.....	6	575	764.97
68th St., Prairie Ave. west.....	6	275	197.80
54th Place, Drexel Ave. to Ingleside Ave.	6	270	240.88
64th St., Kimbark Ave. west.....	6	250	297.99
55th St., Lake Ave. east.....	6	339	539.98
St. Louis, Archer Ave. to 47th St.....	8	704	681.62
Richmond St., 44th to 45th.....	8	625	635.16
Central Pk. Ave., Henderson south....	8	250	131.02
Dakin St., 54th Ave. west.....	8	300	175.73
Springfield Ave., Milwaukee Ave. to School St.	8	439	283.96
Avondale Ave., Irving Pk. Boul. to 41st St.	8	440	259.49
Oakdale Ave., Sheridan Rd. to Lincoln Pk.	8	620	424.89
Laurel Ave., Thomas St. to Division St.	8	670	369.28
Willow Ave., Haddon Ave. to Division St.	8	340	208.76
Wellington St., Sheridan Rd. to Lincoln Pk.	8	618	334.24
Barry Ave., Sheridan Rd. to Lincoln Pk.	8	497	327.29
Briar Pl., Sheridan Rd. to Lincoln Pk..	8	340	242.50
54th St., Cornell Ave. to East End....	8	408	566.66
50th St., Drexel Boul. to alley west....	8	385	364.37
Colfax Ave., 77th St. to 78th St.....	8	706	422.90
96th St., Escanaba Ave. to Muskegon..	8	338	143.05
107th St., Calhoun Ave. to Bensley Ave.	8	376	151.34
57th St., Hamilton Ave. west.....	8	90	143.41
48th Ave., Ainslee St. to Strong St....	12	300	258.51
			12,622 \$10,112.34

This gives an average of \$0.801 per foot.

TABULATION OF COST OF PIPE LAID WITH TRENCHING MACHINE—60 DAYS, JULY 20 TO SEPT. 20, 1913.

Location	Size	Length	Cost of Labor and Teams
Nelson St., 40th Ave. to Kathleen Ave.	8	595	\$275.40
Drake Ave., Wilson to Leland Ave.	8	726	240.23
53d Ave., Fullerton Ave. to Greenwood Ter.	8	672	215.32
81st St., from Center Ave. to Loomis St.	12	1294	724.85
59th Ave., Fullerton Ave. to 398 ft. north of Greenwood Ter.....	8	1081	272.58
107th St., Indiana to Prairie (system)	8	2006	702.73
Wabash Ave., 105th St. northward..	8	447	144.88
57th Pl., Hamlin Ave. to Central Pk. (system)	8	1610	462.03
Kedzie to Sacramento—61st St. to 63d St. (system).....	8	6584	1583.22
Total		15,015	\$4,621.24
Cost of transportation between jobs.....			\$1,703.41
Cost of material, supplies and repairs, taken at .008 per ft.....			118.33
1% for interest on \$7,350.00.....			73.50
4% for depreciation on \$7,350.00.....			294.00
			\$6,810.48

This gives an average of \$0.454 per foot.



EXCAVATING WATER WORKS TRENCH, CHICAGO.

REQUIRING CONSUMERS TO INSTALL METERS

Power of Municipalities Owning Waterworks to Compel Consumers to Install and Pay for Water Meters—Court Decisions.

By JOHN SIMPSON.

It appears, by practical unanimity of the authorities, that, given broad enough statutory powers, municipal corporations owning waterworks may pass ordinances requiring consumers of water to install, at their own expense, water meters for measuring the water supplied to them, provided these are reasonable, and not arbitrary or discriminatory; and it has even been held not discriminatory to require a certain class of consumers to provide and pay for meters, while exempting other classes. In this respect it would appear that such municipal corporations are to be distinguished from private water companies. As to the latter, with which we do not deal in this article, it has sometimes been held that the particular company must provide and pay for meters themselves, while other cases are to the contrary effect.

The leading case upon the subject is that of *State ex rel. Hallauer v. Gosnell* 116 Wis. 606, 61 L. R. A. 33 (1903). Here it was held that a provision in an ordinance of La Crosse, Wis., a city operating its own system of waterworks, which permitted certain consumers to have meters at their own expense, and required those using a service pipe larger than three-fourths of an inch in diameter to use meters, was within the express powers given to the common council under the city's charter. In the general enumeration therein of the powers of the council, it was authorized to legislate by adopting such means as it might deem expedient to prevent waste of water and to protect and regulate the waterworks, and to enforce such legislation by suitable penalties. The council was empowered to legislate as to means for ascertaining amounts to be paid as water rates by consumers, and also, in its discretion, for the "protection of the works and the use thereof." It was held that under these two provisions the requirement in the ordinance for consumers, in certain cases, to use meters, and to provide and keep them in repair at their own expense, was legitimate. It is a matter of common knowledge that the use of meters has a double purpose, and that the dominant one, as regards the party furnishing the opportunity to take water, is to prevent useless consumption thereof. Secondarily to that, and more for the benefit of the consumer than the party responsible for keeping up an adequate supply of water under proper pressure, is the measurement of the water. The consumer is burdened with the expense of providing a meter and keeping it in repair, but has the countervailing advantage, by the exercise of prudence in the use of the water, of paying only for the amount actually taken from the water supply, which, in most cases, by reasonable attention, can be made much less than what he would be required to pay by the schedule of rates where meters are not used.

It was argued that a meter is a mere convenience solely for the party furnishing the water. This was held to be fallacious; that with as much propriety it might be said that the service pipe, curb stop or use of self-closing faucets and other appliances that might be mentioned, are mere conveniences for the party furnishing the water. They are necessities, required as a condition of the consumers taking water from the public supply, made so by the legislative authority contained in the charter, already referred to. The whole scheme of the charter, it was said, was that the consumer should bear all of the expense necessary to enable him to take water from the public

supply. The service pipe, laid in the street from its connection with the water main to the curb stop, under the scheme of the charter, was required to be put in by the consumer or the owner of the property to be served.

A point was made that the meter requirement in the ordinance fatally discriminated against consumers using large service pipes, in that it imposed upon them the burden of procuring a meter, while it left the matter of using a meter by others optional. In regard to this point the court said that it could see a good reason why there are dangers to be guarded against where water is taken from a water main through a large service pipe, which, if they exist at all, do not to the same extent where a small service pipe is used. The different conditions may, and probably in the case at bar did, justify the classification made by the ordinance.

No reported case, either before or since the *Hallauer* case, is absolutely at variance with the ruling therein. Any apparent conflict is probably due to the construction of the municipalities' powers under the differently worded statutes.

In close accord with the *Hallauer* case as to the reason for granting statutory power to a city to select water meters and install them in residences at the expense of the consumer is *Mallon v. Board of Water Commissioners*, 144 Mo. App. 104, 128 S. W. 764 (1910), where it was held that a board of water commissioners charged with the duty of operating and maintaining waterworks belonging to a city may require the installation of meters at the expense of the consumer, and may order such meters to be of a certain make or design. There the court said: "It is a matter of common knowledge that where water is supplied without limit, at a stated price, many consumers waste it. The knowledge that the quantity used will not affect the price begets indifference and encourages negligence. Nothing affords a better check on this fault of a large part of the human family than self-interest. So, therefore, the installation of devices through which it may be known what quantity of water a person uses, and whereby he may be required to pay in proportion to the quantity, are considered to be reasonable regulations. The good effect of such legislation is double; it leads to the payment by each person for the quantity he consumes, and it protects the general supply."

In New York the question of the constitutionality of such a statutory provision has been raised and decided in the affirmative. In an early case, *Hill v. Thompson*, 18 Jones & S. 165 (1884), it was held that a statute which authorized the commission of public works to place a water meter in any building in the city of New York (except private dwellings), where water is furnished for business consumption, at the expense of the owner or occupants of such buildings, and which made the cost of the meter a lien upon the premises, is not unconstitutional. In a recent case, *Swanberg v. City of New York*, 123 App. Div. 774, 108 N. Y. Supp. 364 (1908), the Appellate Division held that section 475 of the charter of the City of New York, authorizing the commissioners of water supply, in their discretion, to place meters on the property of consumers at their expense, is not unconstitutional as taking private property without due process of law. "While it is true," said the court, "that the City of New York in delivering water to private individuals acts in a sense as a private corporation, yet the duty and obligation of the municipality to afford fire protection and to safeguard the public health through a pure and wholesome supply of water, makes the maintenance of the water system more of the nature of a duty owing by a public or municipal corporation, and to say that it is not within the province of the State Legislature in authorizing the City of New York to construct and main-

tain a water plant, to provide for placing meters upon the premises of those who are to use the property of the individual without due process of law, is carrying constitutional limitations to the limit of absurdity."

In *Powell v. City of Duluth*, 91 Minn. 53, 97 N. W. 450 (1903), a rule of a board of water and light commissioners that meters might be placed upon any water service at the wish of the owner or occupant of the premises, or at the pleasure of the board, and in both cases the board would furnish the meter at the expense of the consumer, was upheld as not unreasonable or arbitrary.

In *Anderson v. Village of Berwyn*, 135 Ill. App. 8 (1907), an ordinance providing that meters should be installed at the expense of the consumer, and that the village might designate the character of the meter to be used, was upheld. In *Sackett v. City of Morris*, 149 Ill. App. 152 (1909), the ordinance read, "All meters shall be purchased by the city and sold to the water consumers at cost." One of the chief points of the controversy was that the ordinance compelled consumers to buy their meters of the city; but the city disclaimed this meaning, and asserted that all that was meant was that if consumers bought their meters of the city, the city must sell to them at cost, and that consumers might install any standard meter which had been used and found satisfactory in other cities.

Two cases appear to be opposed to those cited above; but the apparent conflict may be due, as we have pointed out, to differences in the statutory provisions. This seems to be sufficiently shown by the language of one of these decisions, *Albert v. Davis*, 49 Neb. 579 (1896), where it was said: "The authority of a municipal corporation in the premises is, however, so purely a question of statutory construction that the adjudications of foreign courts are practically of no assistance." There can be no doubt that the terms of the authorizing statutes are the primary consideration in testing the validity of such ordinances. In this instance general statutory provisions conferred upon the city power to enforce all needful rules and regulations for the use of water, and to assess and collect a rent or rate for the use of water. It was held that this did not authorize the city to require consumers to supply meters at their own expense, there being not only an absence of express power in the city to sell meters or to compel consumers themselves to supply them, but, on the other hand, an affirmative grant of power to fix and collect charges for the use of water meters, thus excluding by implication the power to compel consumers to furnish their own meters. In the other case, *Red Star Steamship Co. v. Jersey City*, 45 N. J. L. 246 (1883), it was held that a statute enabling the board of public works to make by-laws, rules and regulations for the security and proper management of the waterworks and drainage, for the introduction of water into the houses, and to regulate the use thereof, as to them might seem necessary and proper, did not authorize the city, without the consumers' consent, to furnish him with a meter and charge him with the cost.

In *Cooper v. City of Goodland*, 80 Kan. 121, 102 Pac. 244, 23 L. R. A. (N. S.) 410 (1909), it appeared that under the provisions of chapter 135, p. 223, Kansas Laws 1907, power is delegated to cities of the second class to make by ordinance every reasonable and necessary regulation for the control, operation, and maintenance of waterworks plants supplying the inhabitants of the city, provided such regulation be not in derogation of the laws of the state, nor subversive of the property rights of the inhabitants. It was held that an ordinance of such a city providing that meters of the kind and make ordered by the mayor and council should be furnished, or the expense thereof be borne by the consumers severally, was not unreason-

able, but was valid. "As is commonly the case," the court said, "it may be in Goodland that some of the taxpayers of the city are not so located that they can, and they do not, in fact, use water from the public waterworks. If this be true, it seems very reasonable that they should be relieved of any contribution to pay for the meters of those who do use the water, and very reasonable that the consumers of water should pay for the meters of which they alone, as individuals, get the benefit." It was also held that the grant of power from the legislature to the city was sufficiently broad to authorize the provision of the ordinance.

A novel point was decided in the case of *Shaw Stocking Company v. Lowell*, 199 Mass. 118, 18 L. R. A. (N. S.) 746 (1908), where it was held that a municipality empowered by statute to conduct the city's waterworks, regulate the use of the water, and establish and collect the price to be paid therefor, might require water supplied to a private fire system to pass through a meter to be provided at the expense of the owner of the premises, the purpose being, not to require payment for water used for the extinguishment of fires, but to prevent the surreptitious or careless withdrawal of water through such pipes for other purposes.

It remained for the Georgia Supreme Court, per Mr. Justice Lumpkin, in the latest decision on this subject, *Farkas v. City of Albany* (Ga.) 82 S. E. 144, decided this year, to draw a distinction between the case of a water company and that of a municipal corporation owning waterworks. "Rulings that waterworks companies," he said, which have been granted a franchise to furnish citizens with water measured by the gallon, must generally provide the means of making the measurement, and similar cases, do not deny to a municipal corporation owning waterworks the right to require consumers to furnish meters at their own expense, if its charter so authorizes. We think it unnecessary to discuss the various cases of waterworks companies, and the legislative acts or contracts under which it was held that the duty of furnishing meters rested upon them." The question has been: What had the Legislature actually done in a given case? By the charter of the City of Albany, Ga., a board of water, gas and electric light commissioners was given power to establish a scale of water, gas and electric light rates, etc., and "to furnish at cost, place and compel the use of meters, and prescribe the kind, and make the use of same a condition precedent to furnishing premises with water, gas or electricity, and to prescribe how and where such meters shall be placed." It was held that the board had authority to install on the sidewalk in front of the premises of a property owner, a water meter, through which he could take water, to require him to pay the cost thereof, and to have the water cut off upon his refusal to pay.

STREET CLEANING NOTES.

In Chester, Pa., the streets in the business section are cleaned once a day and those in the residence section about once a week. A two-horse sweeper, a sprinkler, two carts and four men do the cleaning. The highest amount ever done in one day was 56,110 square yards, which is considered an excellent record by Joseph Messick, superintendent of streets and public improvements. Snow is removed from the congested parts of the business section only, in which the city is assisted by the traction companies.

TYPHOID FROM FOOD MATERIALS.

Upon the outbreak of a typhoid epidemic, the attention of the public and of the authorities is naturally di-

rected first toward the water supply, second probably to the milk supply. In an epidemic which occurred some months ago in Rockford, Ill., the State Board of Health discovered that the most formidable group of cases probably resulted from the single case of an employe in a bakery, and it is believed that from him it was spread to two dairy routes. This instance should serve to attract attention to the possibility of other mediums of contamination besides milk and water, especially other food materials.

DANGEROUS FIRE CONNECTIONS.

In reporting upon an epidemic of typhoid fever, the Illinois Board of Health stated that although the water supply was found to be in no way responsible for the outbreak, certain defects were found which were considered serious and which were remedied. This danger was one which has already been pointed out several times, but the fact that it was found to exist in this case would indicate that it had not attracted sufficient serious attention and that there are probably many other cities where the same dangerous conditions may be found.

The condition referred to was the existence of fire connections from the city mains to factories which also used a polluted supply through their own fire pumps, there being a possibility of the latter supply passing back through the fire service pipes into the public mains. Where there are such conditions there is always some danger, but it has been reduced in many instances by the introduction of double check valves, together with means for readily testing their condition. The sketch shows an arrangement of this kind as employed in Illinois. Three gate valves and two check valves are inserted on the fire line between the street main and the first opening in the property; the two check valves being a double protection on the theory that there is much less probability of both being stuck open at the same time than of one only being in this condition. A and B in the sketch are the two check valves and C and D two gate valves which are always left open except when closed for repairs. E is the city shut-off valve, manipulated by the city water officials only. By means of nipples and petcocks, a, b and c, and by closing and opening the valves C and D, it is possible to determine the tightness of each of these two valves and of the check valves. The valve D may be closed while polluted water is being forced into the factory system, as a reinforcing of the two check valves. Ordinarily, however, the valves C and D are left wide open, and to make sure that fire protection from the city mains is always instantly available, these two valves are connected by wire with the telegraph service in such a way that instant notification is given to the fire insurance companies should the valves be closed. The insurance requirements stipulate that a pressure of 85 pounds be

maintained in the factory at all times, while the pressure on the mains is but 50 pounds; and this difference in pressures tends to keep the check valves tightly seated. There is danger that, should the pressure on the factory side become less than the city pressure, the check valves would be opened and become stuck in that position, allowing a flow from the factory system back into the mains when the pressure in the former was again raised.

In addition to these devices, further safety is secured by the systematic municipal inspection of all these connections. It is conceivable, however, that this inspection might be neglected and that gate valves or check valves might fail to close tight, or the check valves remain open as before suggested.

In reporting upon this epidemic, the State Board of Health called attention to these dangers and the seriousness of them, and recommended that all connections between the public water supply mains and factory fire protection systems should be abandoned at the earliest date consistent with securing an adequate substitute independent of the public supply mains.

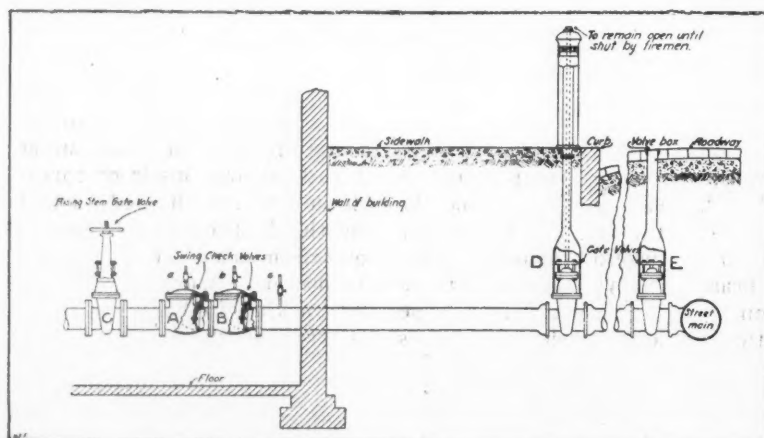
BRASS IN WATER WORKS CONSTRUCTION*

Bolts and Plates Found to Crack, Though Not Used—Castings Apparently Not Affected—Discussion of Cause and Remedies.

For many years hydraulic engineers and manufacturers of equipment and materials to be exposed to water and atmospheric moisture have sought a strong, uncorrodible, moderate-priced metal or a method of rendering iron and steel greatly resistant to corrosion. For about forty years several kinds of forgible copper alloys have been produced having high tensile strengths, for which very broad fields of usefulness seemed open in engineering construction. These alloys have been commonly known as bronzes or brasses.

Claims of brass or bronze makers backed up by tests and experience led the engineers of the Catskill aqueduct, after careful investigation, to adopt some of these copper-zinc alloys for extensive use where their non-corrodibility and other good qualities claimed for them made them especially suitable. It is safe to say that on no other single engineering enterprise have such large quantities ever been used, the total being nearly three million pounds. More than two million pounds of this was in the form of castings ranging from a fraction of a pound to 22,000 pounds each. Forgings constituted a large proportion of the remainder, varied from small bolts to sluice gate stems about 6 inches in diameter and 31 feet long, weighing 3,200 pounds each. The balance was made up of plates, rods and shapes. Manganese bronze constitutes a very large proportion of the total, "naval brass," including Tobin bronze, was used in large amounts and various common brasses and special compositions made up the relatively small remaining quantity. As an illustration of some of the larger castings may be mentioned the shaft caps, one of which is shown in the accompanying illustration.

It was not in these large castings, however, that trouble was experienced, but in the smaller objects, such as bolts, ladder rungs and pipes. These numerous and various brass articles had been made by a number of manufacturers scattered through New England, New York, Pennsylvania and New Jersey. The experience of



ARRANGEMENT OF VALVES ON FACTORY FIRE CONNECTION.

*Abstract of an article before the Municipal Engineers of the City of New York by Alfred D. Flinn, deputy chief engineer, Board of Water Supply of New York City.

the Catskill aqueduct with these brass articles may be summarized as follows: Large numbers of brass bolts have been found cracked and broken in their packing boxes after storage through a winter, but having never been stressed; others never exposed to low temperatures and never stressed have been found in similar condition. These bolts ranged from $\frac{1}{2}$ inch to $2\frac{1}{4}$ inches in diameter. Similarly, flat bars, rolled plates and long rods supporting only their own weight have been found cracked or severed after a lapse of a few or many months. Flanged $\frac{1}{4}$ -inch plates riveted together, after careful inspection being in apparently good condition, were found some months later to have incipient and well developed cracks, with many rivets cracked or yielding to relatively light blows from a hand hammer. Many upset rivet heads have come off. Hundreds of bolts have broken under tension after short or long intervals. The failures have been so numerous and important as to have caused the gravest apprehension and led to the substituting of steel for brass in many cases, in spite of the recognized disadvantage of steel as to corrosion which the engineers had sought earnestly to avoid.

No brand or make of brass or bronze has wholly escaped. Manganese bronze, naval bronze (including a well-known bronze, and its imitation), and Muntz metal, from all the manufacturers who have furnished any considerable quantity, all have failed. Hitherto castings and large forgings have been exempt, or at least failures in them have not been discovered, except in a few cast bolts and nuts.

When studying the extent and cost of these failures, it was found that other users also have had trouble of one kind or another, knowledge of which has come to hand within relatively recent time. At just what date or when in the state of development of brass manufacture these troubles began, or how extensive they have been, has not yet been learned. Possibly they might have been considered occasional or accidental but for the large use of these alloys on the Catskill aqueduct under supervision which led to a detection of these defects.

The discovery of these failures in the fall of 1913 was all the more disappointing because the specifications had been drawn carefully in the light of information which is in hand and practically all the metal accepted had been subjected to careful inspection, including the standard physical tests and chemical analyses. Much of the metal accepted had shown physical qualities in generous excess of the specified requirements, and it is quite unthinkable that the manufacturers were not honestly endeavoring to fulfil the specifications and furnish satisfactory materials.

Among the physical characteristics required were that manganese bronze should have a tensile strength of not less than 65,000 pounds per square inch, an elastic limit of not less than 45 per cent of the ultimate tensile strength and an elongation of not less than 25 per cent. That rods for brass rivets should have a tensile strength of not less than 55,000 pounds per square inch, an elastic limit of not less than 30,000 pounds, and an elongation not less than 20 per cent. It is known that in brasses the elastic limit or yield point is not well defined and, judging from some experiments recently performed, must under prolonged stress be regarded as the ultimate strength. It was known that apparently sound brass pipes and some kinds of brass wire would occasionally crack without evident reason; but leading manufacturers of brass pipe have discovered how to modify the details of manufacture so as to overcome these troubles in a large measure, and little trouble has been experienced with pipes furnished by reputable manufacturers in re-

cent years. There is, therefore, small excuse for supplying other than dependable brass pipe nowadays.

Experiments carried on by Inspector Jonson of the Catskill aqueduct laboratory demonstrated that improperly cold-worked rods were in a state of initial stress, and that these stresses were frequently of important magnitude, so that in many cases a small or moderate increment of stress, like temperature change or load, would produce failure. By placing round rods in a lathe and removing their exterior surface, accurate measurements showed that the length of the rod gradually increased, demonstrating that the interior metal had been under compression and the exterior surface in tension. Conversely, on boring a good sized core from the inside of rods, the rods shortened, again demonstrating the same condition. From the amount of expansion or contraction in length it was possible to calculate with close approximation the stresses and strains in the material.



A 72 x 48 x 48-INCH BRONZE SHAFT CAP.

Martens and Heyn, the eminent German physicists, have developed a method for determining the tendency of brass to crack by applying a solution of mercury salt to the surface of a brass rod under initial stress. Cracks would be developed almost instantaneously or in a few minutes in some specimens, while in others the cracks would not become apparent for a number of days. This mercury test has been used by the Board of Water Supply and, while useful, has not proved infallible, some rods which gave negative results under this test subsequently cracking. Moreover, it would be manifestly impracticable to apply this test to the whole surface of every rod of a large shipment, and a more practical test is desired by which one can make sure that brass rods or other articles being purchased or already in place are permanently free from the tendency to crack.

After the discovery of the extensive cracking referred to, it was decided to use plain extruded or hot-rolled rods wherever practicable and to anneal all material which had to be drawn or rolled whole. Unfortunately, this method of manufacture did not avoid further trouble of this kind. Plain extruded, hot-forged and annealed brass rods supposedly free from initial stress have also failed in disturbingly large quantities.

Some experiences and observations indicate that corrosion has much to do with the cracking of brass under some circumstances. Apparently certain kinds of corrosion greatly reduce the cohesion of the affected part of the material, thus destroying the ductility so that cracks develop as soon as the deformation extends to or beyond the yield point. If this conclusion be true, it should be possible to produce season cracking in bars free from appreciable initial stress by stressing them by means of an external force and then corroding the surface. Experiments made in the laboratory of the Board of Water Supply demonstrated that such results were obtained, both strong ammonia and mercury salt solution being

used as corroding agents. Tests made indicated that brass, especially when subjected to a tensile strength approaching the yielding point, is liable to inter-granular oxidation which may penetrate indefinitely along certain planes of weakness. This opinion is confined by the appearance of breaks, which indicates that the metal is not torn apart, as in a tensile test, but parts gradually along the boundaries of the grains, which are supposed to be groups of very small and intimately mixed copper, zinc and tin crystals.

The author concludes as follows:

For the designing and constructing, civil and mechanical engineers, the following questions should be satisfactorily answered, if they are to continue the use of these brasses or bronzes for important purposes:

Can a brass or bronze of high tensile strength be reliably produced which can be used safely for important permanent structures in such parts as bolts and other rolled, drawn, extruded or forged shapes?

What should be the specifications for such brasses or bronzes?

What inspection methods and tests should be used?

By what tests can the tendency to subsequent failure be detected at any time after manufacture?

What working stresses may be used safely for these various alloys?

Will these brasses, or bronzes, deteriorate by reason of constantly applied or frequently repeated stress;—i. e., will they fail from fatigue?

STANDARD FOR DRINKING WATER

Maximum Limits of Permissible Bacterial Impurity, Adopted by the Treasury Department for Water Served by Common Carriers

Early in this year the Secretary of the Treasury appointed a commission to recommend a standard for drinking water for the purpose of the administration of the interstate quarantine regulations as they relate to the drinking water supplied to the public by common carriers in interstate commerce. This commission was composed of fifteen members, of whom the chairman was John F. Anderson, director of the hygienic laboratory, and seven were professors in colleges, three were connected with state health boards, and two with the federal Public Health Service.

This commission recommended a standard which was adopted by the Treasury Department on October 21; which standard is as follows:

BACTERIOLOGICAL STANDARD FOR WATER.

The following are the maximum limits of permissible bacteriological impurity:

1. The total number of bacteria developing on standard agar plates, incubated 24 hours at 37° C., shall not exceed 100 per cubic centimeter. Provided that the estimate shall be made from not less than two plates showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.

2. Not more than one out of five 10 cc. portions of any sample examined shall show the presence of organisms of the bacillus coli group when tested as follows:

(a) Five 10 cc. portions of each sample tested shall be planted, each in a fermentation tube containing not less than 30 cc. of lactose peptone broth. These shall be incubated 48 hours at 37° C. and observed to note gas formation.

(b) From each tube showing gas, occupying more than 5 per cent of the closed arm of fermentation tube, plates shall be made after 48 hours' incubation, upon lactose litmus agar or Endo's medium.

(c) When plate colonies resembling *B. coli* develop upon either of these plate media within 24 hours a well-isolated characteristic colony shall be fished and transplanted into a lactose-broth fermentation tube which shall be incubated at 37° C. for 48 hours.

For the purposes of enforcing any regulations which may be based upon these recommendations the following may be considered sufficient evidence of the presence of organisms of the *Bacillus coli* group.

Formation of gas in fermentation tube containing original sample of water (a).

Development of acid-forming colonies on lactose litmus agar plates or bright red colonies on Endo's medium plates, when plates are prepared as directed above under (b).

The formation of gas, occupying 10 per cent or more of closed arm of fermentation tube, in lactose peptone broth fermentation tube inoculated with colony fished from 24-hour lactose litmus agar or Endo's medium plate.

These steps are selected with reference to demonstrating the presence in the samples examined of aerobic lactose-fermenting organisms.

3. It is recommended, as a routine procedure, that in addition to five 10 cc. portions, one 1 cc. portion, and one 0.1 cc. portion of each sample examined be planted in a lactose peptone broth fermentation tube, in order to demonstrate more fully the extent of pollution in grossly polluted samples.

4. It is recommended that in the above-designated tests the culture media and methods used shall be in accordance with the specifications of the committee on standard methods of water analysis of the American Public Health Association, as set forth in "Standard Methods of Water Analysis" (A. P. H. A., 1912).

The commission submits this as an incomplete report, not dealing with certain questions concerning which it is not yet in perfect agreement; but recommends the adoption of those included herein. It especially disavows its intention to propose a "standard of purity," calling attention to the absurdity of that expression. "Since purity is an absolute, not a relative, quality, it is obvious that there can be no 'standard of purity' other than absolute purity." It recommends "limits of permissible impurity," not as the nearest approximation to purity which it is desirable to obtain, but the furthest deviation from purity considered permissible.

These limits were designed to meet the following requirements:

"1. That water supplies conforming to the prescribed requirements shall be free from injurious effects upon the human body and free from offensiveness to the sense of sight, taste or smell.

"2. That supplies of the quality required shall be obtainable by common carriers without prohibitive expense.

"3. That the examinations necessary to determine whether a given water supply meets the requirements shall be as few and as simple as consistent with the end in view."

The difficulties to fixing a limit to the physical and chemical properties and the fact that they are of minor sanitary importance have been the reason for leaving this limit for further consideration.

"In submitting the recommendations herewith presented it may be again emphasized that the limits defined are recommended with reference solely to the special object of the control of the supplies of common carriers, having in mind that these supplies constitute a special case because of the following reasons:

"1. The supplies come from widely diversified and mixed sources.

"2. Samples taken from common carriers represent waters stored for various lengths of time under varying conditions.

"3. In view of the impossibility of accurately ascertaining the source and history of each supply examined, reliance must be placed upon results of laboratory examination to a greater extent than is necessary or justified in estimating the quality of a supply from a known source with a known history.

"It is requested that the recommendation of these hard-and-fast limits of bacteriological impurity be not interpreted as minimizing in any way the importance of field surveys in estimating the sanitary quality of water supplies in general. It is always desirable to obtain information from as many angles as possible, and this is, indeed, necessary in order to form an altogether fair estimate of an individual supply."

Municipal Journal

Published Weekly at
50 Union Square (Fourth Ave. and 17th St.), New York
By Municipal Journal and Engineer, Inc.
Telephone, 2805 Stuyvesant, New York
Western Office 608 S. Dearborn Street, Chicago

S. W. HUME, President
J. T. MORRIS, Treas. and Mgr. A. PRESCOTT FOLWELL, Secretary
C. A. DICKENS, Western Manager
A. PRESCOTT FOLWELL, Editor

Subscription Rates

United States and possessions, Mexico, Cuba.....\$3.00 per year
All other countries..... 4.00 per year
Entered as second-class matter, January 3, 1906, at the Post Office at New York, N. Y., under the Act of Congress of March 3, 1879.

CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

DECEMBER 24, 1914.

CONTENTS

The Storage Battery for Electric Plants. (Illustrated). By J. F. Springer	915
Lighting Residence Streets in Helena. (Illustrated). By Charles W. Helmick	917
Chicago Water Works Notes. (Illustrated).....	918
Requiring Consumers to Install Meters. By John Simpson.....	920
Street Cleaning Notes.....	921
Typhoid from Food Materials.....	921
Dangerous Fire Connections. (Illustrated).....	922
Brass in Water Works Construction. (Illustrated).....	922
Standard for Drinking Water.....	924
"Purity" of Water	925
Brass for Water Works Appurtenances.....	925
Testing Fire Hose.....	925
Municipal News. (Illustrated).....	926
Legal News—Notes of Recent Decisions.....	932
News of the Societies	933
Personals	937
New Appliances. (Illustrated).....	938
Industrial News	939
Contract News	940

"Purity" of Water.

In the report which it made to the Secretary of the Treasury, the commission appointed by him to prepare a standard for drinking water, called attention to the absurdity of the expression "standard of purity" which is so often used. "Since purity is an absolute and not a relative quality, it is obvious that there can be no 'standard of purity' other than absolute purity," says the commission. It therefore recommends the term "limit of permissible impurity" as more correctly expressing the idea. Similarly others have suggested the use of the word "safe" to be substituted for "pure" in speaking of potable water, since no public water supply is pure or ever can be.

This may seem to some like splitting hairs or pedantic affectation; but we believe that the wrong use of the terms has led many fairly intelligent persons to believe that it is possible to furnish pure water to consumers, and consequently to object to the addition to or presence in the water of anything other than hydrogen and oxygen. It seems probable that the proper use of these terms might go far toward bringing about a popular understanding of which characteristics and impurities affect the safety and which ones the agreeableness of water, and that many have no effect except through the imagination. And thus many of the troubles of the water superintendent and engineer might be eliminated.

Brass for Water Works Appurtenances.

The article in this issue describing the failure of large numbers of brass and bronze bolts and other pieces obtained for use in appurtenances of the Catskill aqueduct would seem to be of the greatest interest to water works superintendents and engineers. Almost every valve, hydrant, pump or other element of a water works plant having moving parts contains more or less brass. In many cases the entire body is of "bronze." If the chances are one in ten or even one in one hundred that the brass valves, seats, pistons, stems and other parts of the various mechanisms will fail in a few weeks or years, the situation is serious. But we do not believe this is the case.

The parts referred to by Mr. Flinn failed in a few months, many without any use at all. Why, we cannot say. But immense numbers—probably millions—of brass parts have been used in water works construction during the past 40 years; and while many have been found defective, our own experience and such information as has reached us leads us to believe that brass is but little less reliable than iron, within its known limits. The article in question may give each superintendent good reason to examine the brass parts of his valves, hydrants and special mechanisms and to watch them carefully in the future; but we cannot believe that any abandonment of the use of these standard alloys is called for.

Testing Fire Hose.

The story is told of a man somewhat the worse for his evening's libations who, on the way home, bethought himself that he had only one match for lighting the gas in his room. "What a fix I'd be in," said he, "if this match is no good. I guess I will try it and see if it is." He did. It was.

Recent reports from Philadelphia would seem to indicate that the fire department there is in something the same predicament, but is hesitating whether to strike the match or not. For some time the National Board of Fire Underwriters has been urging that the department test its fire hose, claiming that 40 per cent of that in use in the city was five years old and probably too weak to withstand a test of 200 pounds to the square inch. Recently a request amounting almost to a demand was made by the National Board of Fire Underwriters that every length of hose be tested. Director George D. Porter, however, declared that there was no surplus of hose in the city and no money had been appropriated for purchasing it; and that, assuming the fire underwriters are correct, submitting all the hose to this pressure would result in the discarding of possibly 40 per cent, which would leave the department very much short in case of a large fire. We presume that it is thought (and probably rightly so) that there is a fair chance of still getting considerable service from a hose which would stand a pressure up to nearly 200 pounds, but still would burst and be rendered entirely useless if tested under that pressure; and that consequently the danger of even 25 per cent of this suspected hose bursting under the actual service pressure of 90 to 150 pounds is less than that which would result from taking out of service four times that amount.

At the same time, there would seem to be no question that the city should be supplied with a sufficient amount of hose none of which is in any danger of bursting during a fire, which bursting might easily reduce considerably the effectiveness of the fire fighting, or might imperil the lives of some of the firemen. If the matter in Philadelphia has reached the serious stage which would be indicated by these demands of the National Board of Fire Underwriters, it would seem that there should be little difficulty in convincing councils of the necessity of making an appropriation for purchasing the necessary amount of new hose.

The WEEK'S NEWS

State Road Finance in Minnesota and Massachusetts—Improvements in Schenectady, Pittsburgh and Elizabeth—Massachusetts Health Council—Springfield, Ill., Water and Sewerage Survey—Metering in Charleston, S. C., and Philadelphia—Light Rates in Boston, St. Paul and Holyoke—Motor Apparatus in the Cities—Cities Want Commission and City Manager Forms—Colorado and Connecticut Public Utilities Commissions.

ROADS AND PAVEMENTS

To Boost "Dixie Highway."

Indianapolis, Ind.—Governor Ralston has issued a call to the governors of Illinois, Kentucky, Tennessee, Georgia and Florida to meet January 11 in Chattanooga to consider the forming of a North and South highway association. The purpose will be to boost the Dixie highway from Chicago through Indianapolis, Louisville, Nashville, Chattanooga, Atlanta and Macon to Jacksonville.

State Aid in Minnesota.

St. Paul, Minn.—The county boards have been prompt this year in auditing their accounts to make application to the state highway commission for their share of state aid for road construction and maintenance. The commission hopes to have the fund cleaned up by the first of next year instead of the spring following as has been the case in the past. The highway commission has paid out \$603,250.89 for state aid in road construction and \$113,404 for maintenance, a total of \$716,655.66, or about 51 per cent of the total fund. This has been paid on 371 miles of earth roads, 110 miles of gravel roads and ten miles of concrete roads, and several bridges.

Big Improvements for Schenectady.

Schenectady, N. Y.—Public improvements amounting to \$1,365,000 will be completed by February 1, according to the report of City Engineer William B. Landreth to Mayor J. Teller Schoolcraft, a part of the general report of the commissioner of public works, Joseph H. Clements, Sr. In the course of the year 24 new streets have been accepted by the city, adding about three miles to city streets. The establishment of grades and grading has been authorized in 31 streets, largely in the newly annexed section, and petitions received for the grading of eight streets, and contracts let for the grading of 9 streets. Sidewalks have been laid in 11 streets and petitions received for sidewalks in three other streets. Grading, paving and laying of sidewalks have been completed in 35 streets. Of the pavement laid, 7,286.5 square yards was of sand filled pave-

ment; 63,173.2 square yards of stone filled pavement; 7,536.2 square yards brick pavement, 1,691.7 square yards granite pavement, and 1,150.6 square yards of concrete pavement. The total square yards of pavement laid is given as 80,838.2. In addition to this a total of 27,427 feet of sidewalk was laid. The total cost of the pavement laid is given as \$226,406.44. In addition, repaving in streets was done at a cost of \$11,121.68. Contracts have been let for the paving of six additional streets, with a total length of 12,740 feet. In the summary it is shown there are 68.4 miles of paved streets, 22 miles of graded streets, 30.76 miles of ungraded streets, or a total in all of 118 miles of accepted streets, with 8.5 miles of unaccepted streets, or a total paved area of 1,232,250.80 square yards. The construction of pavements is under the charge of Assistant Engineer T. B. Bergen.

Auto Road Fees in Massachusetts.

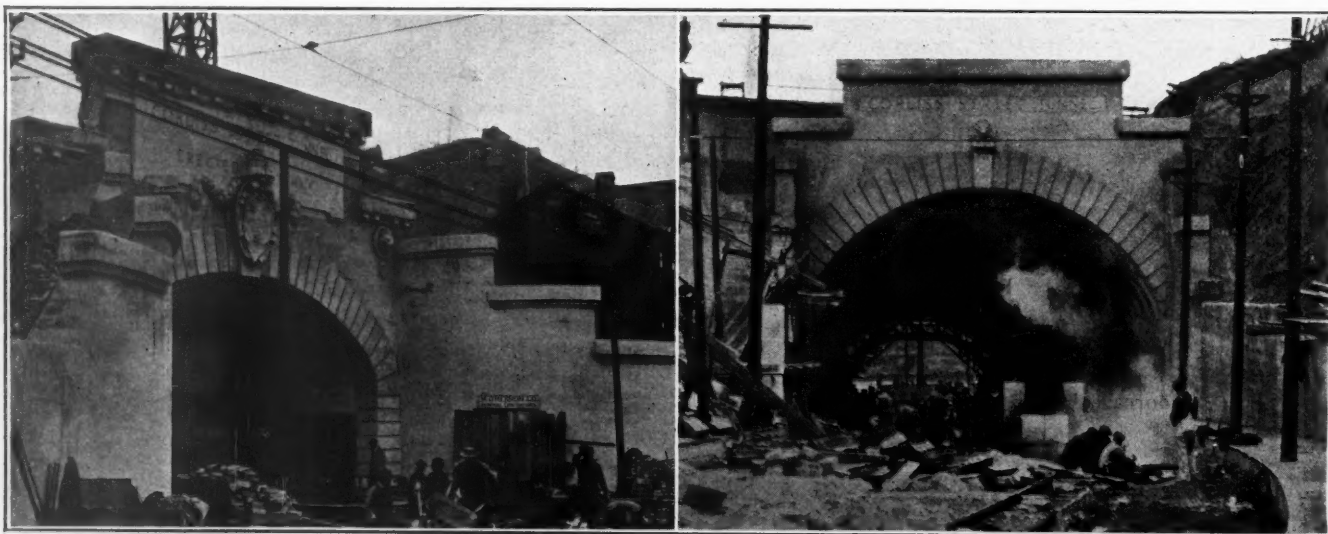
Boston, Mass.—\$965,669.69 has been received by Massachusetts highway in fees for automobile operators' and chauffeurs' licenses and registration fees to Nov. 30, 1914, the end of the fiscal year. This is \$205,667.44 more than was received for the fiscal year of 1913. The total amount collected from fines of autoists was \$39,704.84 this year as against \$39,043 last year. From the two sources, fees and fines, the commissioners will have more than \$800,000 for good roads, construction and maintenance of state highways. The balance of the receipts goes to the payment of maintenance and salaries of the automobile department of the highway commission. There are at present 99,532 persons in Massachusetts licensed to drive motor vehicles, practically one in every 33 individuals in the state.

New Tunnel Opened.

Pittsburgh, Pa.—Following the completion of all the work the new Corliss street tunnel has been opened. Street car tracks have been laid, the portions of the street between the tracks paved and the sidewalks concreted and the paving blocks laid. The illustration shows both ends of the tunnel.

Paving in Elizabeth, N. J.

Elizabeth, N. J.—In a street department report recently compiled on work done during the last ten years it is



Courtesy, Pittsburg (Pa.) Dispatch.

VIEWS OF PITTSBURGH'S NEW TUNNEL.

shown that \$1,060,662.93 has been spent for new pavements. These figures do not include two jobs now under way or several others which are expected to be started in the spring. For brick pavements upon concrete foundations \$483,080.68 has been expended, and almost all the contracts awaiting completion call for the use of a similar material. Stone pavements upon concrete foundations represent an outlay of \$86,962.69, while trap block pavements upon sand foundations cost \$314,239.78. Sand foundations are no longer permitted, as concrete bottoms are now required by the city ordinances. Telford pavements to the extent of \$19,643.33 have been laid, but the use of that material is practically rejected now. The amount spent for asphalt-macadam was \$22,108.58, and for asphaltum, \$124,981.34. The repaving of a street with trap block on concrete at an expense of \$9,646.48 completes the list. The abutting property owners were charged for the great bulk of the paving done in the last ten years. They deposit ten per cent of the contract price before a job is started, and then are allowed to pay the balance in installments extending over a period of years. The city, therefore, temporarily pays that portion of the bill not covered by the ten per cent deposit.

Highway Engineering in University of Illinois.

Urbana, Ill.—The department of civil engineering of the University of Illinois announces that the second annual short course in highway engineering will be given at the University of Illinois from January 11 to 23. A similar course was given last year, the interest being surprisingly wide. The course will be much more attractive this year than last, according to portions of the two weeks' program which has already been arranged. The treatment of the subject this year will be a step in advance to that of studies last year, it being believed that the discussions, addresses and demonstrations will be more particularly interesting this year to highway engineers, to township highway commissioners, and to contractors engaged in bridge and road construction. The co-operation of the state highway commission is assured and members of its staff will present various papers. In addition to this, definite arrangements have been made for one or more addresses by each of the state highway commissioners of Wisconsin, Iowa and Kansas. Several other prominent highway engineers will participate.

SEWERAGE AND SANITATION

Newark Pays for Passaic Valley Sewer.

Newark, N. J.—City Treasurer Elmer A. Day has paid over to John S. Gibson, secretary of the Passaic Valley Sewerage Commission, \$1,147,765.66, representing the eighth and ninth payments the city of Newark has contributed for the flume. Newark is to make fourteen payments for the sewer. So far the city has paid in about \$7,100,000.

Bond Issues in Texas Break Record.

Austin, Tex.—All previous records in the amount of bonds of various kinds issued were broken this fiscal year ending August 31, 1914, according to figures compiled in the controller's department. The figures disclose that during the year ending August 31, 1914, the amount of municipal bonds approved and registered amounted to \$11,323,436, as compared with \$5,473,956 for the previous year, or an increase of \$5,849,480. These bonds were for street improvement, erection of public buildings and construction of sanitary sewers.

Massachusetts Health Council Appointed.

Boston, Mass.—Governor Walsh has sent to the executive council the appointments of Professor George Chandler Whipple, of Cambridge; Professor W. T. Sedgwick, of Boston; Dr. Hilton J. Rosenau, of Brookline; Dr. William T. Gallivan, of Boston; Dr. David L. Edsall, of Hilton, and Dr. Joseph E. Lamoreaux, of Lowell, as the six members of the advisory council to the state commissioner of health. Professors Whipple and Sedgwick are nominated for the three-year terms, Drs. Rosenau and Gallivan for the two-year terms and Drs. Edsall and Lamoreaux for the one-year terms. The health council appointments were confirmed under a suspension of the rules. The statute of 1914 reorganizing the board of health, created a state department

of health to consist of a commissioner of health and the public health council, the six members of which the governor has just named. The law requires that at least three shall be physicians. The council is to meet at least once each month and at such other times as they shall determine by their rules, or upon the request of any four members, or the request of the commissioner. The members are to receive \$10 a day while in conference, and their necessary traveling expenses while in the performance of their official duties. Their duties are to make and promulgate rules and regulations, to take evidence in appeals, to consider plans and appointments required by law, to hold hearings, to submit annually to the general court, through the governor, a report, including recommendations, as to needed health legislation, and to discharge other duties required by law, but the council has no administrative or executive functions.

Cost of Rat-Proofing New Orleans.

New Orleans, La.—Rat-proofing to safeguard against bubonic plague will cost the citizens of New Orleans \$2,000,000 in the opinion of Dr. W. C. Rucker, assistant surgeon-general of the public health service, who is in charge of plague eradication work here. Dr. Rucker expressed the opinion while testifying at the trial of one who is charged with violating a city ordinance requesting property owners to rat-proof their premises. The taxpayers' Association has attacked the validity of the rat-proofing ordinances in court.

New York Wins in Sewage Case.

New York City, N. Y.—Another point has been gained by New York City in its fight to prevent Northern New Jersey communities embraced in the Passaic Valley Drainage District from discharging sewage into New York Bay at Robbin's Reef. Through Chief Justice White, the United States Supreme Court has denied the motion of the New Jersey interests to dismiss the suit brought in 1908, in the name of the People of New York, to enjoin construction of the proposed outlet at Robbin's Reef. The motion was made about a year ago by counsel for the Passaic Valley Sewerage Commission, which has charge of the \$13,000,000 flume now in course of construction from Paterson, out to New York Bay. The motion was based on the ground that New York had been dilatory in prosecuting its case, and the delay was an unreasonable interference with the rights of the defendants. In announcing its decision, the Supreme Court gave no reasons for its action.

WATER SUPPLY

Drastic Ruling Against Water Company.

Harrisburg, Pa.—The Public Service Commission has directed the New Wilmington Water Supply Company, of New Wilmington, Lawrence County, to make an appraisal of its plant, to file its rates, revise its bookkeeping methods and install a standard type of fireplug, and not to permit surface water to flow into its supply springs. This action, thought to be the most drastic of the kind ever taken in this state, was the result of complaints about the company.

Water and Sewerage Survey.

Springfield, Ill.—The sixth section of the survey report on public health in Springfield, just issued, discusses the city water supply and the sewer system. "The present water gathering equipment is composed of the old galleries and six tubular well units. The old large well is still in use, but as a receiving cistern for the other developments. The tubular units consist of a central pit about 20 feet deep and 8 feet in diameter, at the bottom of which is placed an electrically driven centrifugal pump surmounting a 12-inch tubular well, suction lines being also run to supplementary 10-inch wells about 50 feet distant. All the tubular wells penetrate the alluvium of the river bank to a depth of 45 to 55 feet, reaching hard-pan. The yield of these well units is stated to average 1,000,000 gallons per day, the total capacity being thus 6,000,000 gallons. Compared with the average daily consumption of 5,500,000 gallons, this yield would seem fairly adequate, but in view of the fact that the maximum rate of demand reached 8,500,000 gallons in the year ending Feb. 28, 1914, and that the system has practically no storage reserve against pos-

sible conflagrations, and that the city is constantly growing, it is evident that the development, and experiments to determine the limitations of the possible development, should not be allowed to rest." Springfield, after enduring for many years a supply more or less polluted with river water, has within the last few years succeeded in developing this pure ground water supply that promises to be adequate for some years to come.

In discussing the sewerage situation the report points out that the sewers are not as well distributed as the city water mains, the estimates indicating that 17.5 per cent of the population cannot connect, as against 12.3 per cent in the case of water mains. A comprehensive survey of the sewers, including a determination of their grades, sizes and condition, is urged. "Springfield now discharges her sewerage in a more or less haphazard way at some twelve points, either within or shortly outside her boundaries. None of the sewage is treated in any way, and, according to the report of the inspection made by the state water survey during August, 1913, serious pollutions attended with nuisances occurred in the streams receiving the material. There can be no doubt but that if present rapid growth of Springfield continues it will soon become necessary to install sewage treatment works."

Meters Stop Waste.

Charleston, S. C.—A table of comparative meter readings in selected cases for the first two months under the meter system of payments has been compiled by Henry P. Williams, chairman of the committee of City Council on water supply, to show the value of metering in saving water. In each instance the reading for the second month shows a decided saving in gallons. Bad leaks were discovered and economy and care in the use of water followed. In 42 examples, many private residences, a total of 1,145,497 gallons less of water was used during the second than during the first month.

City Must Pay Taxes on Water Mains.

Knoxville, Tenn.—Park City can now collect tax from the City of Knoxville on water pipes and mains in Park City extending from the City of Knoxville. This was the decision of the Supreme Court in an opinion handed down in the case of the City of Knoxville vs. Park City, in which an injunction was granted by the Chancery Court and affirmed by the Court of Civil Appeals to prevent Park City from collecting tax on that part of the water system in Park City. By the decision of the Supreme Court, the injunction is dissolved, and Knoxville will have to pay tax on its lines of piping in Park City. The Court held that in extending its service into Park City the City of Knoxville is transacting private business for profit and that it is liable to taxation.

Baltimore's New Reservoir.

Baltimore, Md.—Officials of the water department are greatly encouraged by the water situation, which is better now than it has been for months. The stream flow in the Gunpowder River at Loch Raven is so strong that it overflowed the old or lower dam, and in order to preserve the water the gates in the new dam have been shut and water is now being impounded behind the new structure. The new dam cannot be placed in service, however, until the tunnel leading to the filtration plant at Lake Montebello is completed. Work is now being pushed on the city end of the tunnel, and as soon as this is finished the contractors will begin at the Loch Raven end. The new reservoir, with the temporary structures, is shown in the illustration.

Water Shortage in Massachusetts.

Boston, Mass.—The water supply situation in Massachusetts, while not critical, is nevertheless regarded by the state authorities as serious, especially in the Berkshire Hills the Merrimack Valley and Bristol County. In many places the emergency supplies of water are being utilized and in all cities and towns the water officials have taken precautions against waste. Many of the 40,000 private wells in the state have been dry since early summer, and farmers are driving their cattle to nearby rivers and are hauling water for domestic needs. Supplies have given out, or emergency supplies have had to be utilized, by Lenox, Pittsfield, Northfield, Newburyport, Lee and North Adams. Many other cities and towns are on the ragged edge and economizing measures may have to be adopted. The supply in Danvers and in Middleton is the lowest ever known, it is said. Official figures show that the rainfall during the past 11 months in various parts of the State is from two to 12 inches below the normal. It is admitted, however, that the water famine is not as severe as that of four years ago. The supply for Greater Boston is extremely satisfactory. The reservoirs for the Metropolitan district hold sixty-four billion gallons at the present time.

Metering in Philadelphia.

Philadelphia, Pa.—Chief Davis, of the bureau of water, estimated that 13,000 meters have been installed this year, making a total of 30,000. With 17,000 meters in operation this year the receipts of the water bureau were reduced \$150,000. There will be a further loss to the city next year when the additional 13,000 buildings are transferred to the meter ratings. The city, however, does not lose the entire difference between the fixture and the meter charges, since the installation of meters results in the conservation of the water supply. This is very important at present when the city's filtration plants are overtaxed to meet the demands for consumption. More efficient management in the operation of the water bureau also has resulted in a saving of expenses greater than the amount lost in the change to meter rates. Approximately \$200,000 has been saved in the water bureau's coal bill. This has been done by changing the grates under some of the boilers so a cheaper grade of coal could be used. Some of the saving is accounted for by better inspection of the delivery of coal both as to quantity and quality.

Begin Survey for Water Supply.

Everett, Wash.—R. E. Koon, chief surveyor with Burns & McDonnell, the Kansas City hydraulic engineers, is in the city making preliminary arrangements to begin work on Everett's proposed municipal water supply. He has begun work in the forestry department in Seattle in collecting data on the Sultan River and the Boulder River sources. Forester Smith has announced that the office had recently completed a new survey of Boulder River and



Courtesy, Baltimore (Md.) News.

BALTIMORE'S NEW RESERVOIR.

its country. While Boulder River is fed by a trio of glaciers on White Horse mountain and the flow may be considered regular, nevertheless there is no opportunity to arrange a storage basin along the stream. There is small reason to believe any source will be harnessed for Everett but Sultan River.

Boonton, N. J., Votes to Buy Water Plant.

Boonton, N. J.—By a vote, which surprised the staunchest advocates of the measure, the citizens of Boonton decided to avail themselves of the option to take over the plant of the United Water Supply Company, which provides Boonton with water. The vote was 595 for the project to 40 against it. By the referendum authority is given to the town authorities to take over the plant at a cost not to exceed \$175,000. The contract between the company and the town expires in January, and for years the town had an option to take over the plant at the expiration of this term.

LIGHTING AND POWER

Boston's Lighting Contract.

Boston, Mass.—The 10-year contract for lighting the streets of Boston with the Edison Electric Illuminating Co., which has hung fire since April 1, was finally and unanimously approved by the city council and goes into effect on July 1. This is the second contract submitted and contains many changes for which the city council held out, the most notable of which is immediate arbitration by the Gas and Electric Light Commission of the fairness of the price of \$87.53 per lamp per year.

Agree on Three-Cent Rate.

St. Paul, Minn.—Electric street lights in St. Paul probably will cost 3 cents a kilowatt-hour next year. This basis was agreed on after city officials and representatives of the St. Paul Gas Light Company had discussed the relative merits of carbon arcs, flaming arcs, and the new nitrogen-filled lamps, which Councilman Keller insists on having installed, and to which Manager Paul Doty of the gas company was opposed. According to the understanding arrived at, all of the lighting will be included in one contract, and will include about 425 of the new nitrogen lamps to be installed, about 500 flaming arcs, and about 800 carbon arc lamps.

"Washington Type" Lighting for New Bedford.

New Bedford, Mass.—A "Great White Way" for New Bedford has been ordered by the street light committee, and at the orders of Robert C. Sherman, chairman of the committee, the New Bedford Gas & Edison Light Company was instructed to put in lights as soon as possible. Fifteen new arc lights are to be installed, all of them of the new "Washington" type similar to those on Pennsylvania avenue, Washington, D. C. The twelve flaming arcs that are now in use will all be taken out to make way for the new lights, which will be mounted on especially-made ornamental posts, and will stand about 20 feet from the ground. The total cost of the installation to the city will be \$1,425 per year. This is a saving of \$525 over the flaming arcs.

Lower Gas Rate for Holyoke.

Holyoke, Mass.—Holyoke will have 90-cent gas, the consent of the State Gas and Electric Commission to this reduction having been received by Manager John J. Kirkpatrick of the gas and electric department. At present the price charged is \$1.20 a thousand cubic feet of gas with a rebate of 20 cents allowed. The new price will be \$1 a thousand with a rebate of 10 cents, making the net price 90 cents a thousand. The city owns both a gas and electric plant which it has operated since 1902. The price of gas, which has been in force since 1906, is \$1 net a thousand cubic feet. The price now proposed to be established by the manager is 90 cents net, and is admittedly less than cost as defined by the statute. The city has recently built a new coal gas plant which gives a capacity for considerably more than the present output, and has about completed the installation of machinery for the economical handling and merchandising of coke. The manager, by reason of these additions to the

works, expects a substantial increase in revenue from the sale of residuals and a consequent decrease in the net cost of gas to be hereafter sold. It was urged that the volume of business should be increased in order that the city might get a proper return on its investment, and to offset this end, it must reduce its price.

Reported Cost of Lighting Plant.

Baker, Ore.—An amended report by Engineer Stockman to the city commissioners has been presented showing that current can be made by the city at a cost of 3.37 cents per kilowatt hour instead of 4.75 cents, as first estimated. The cost of the total system remains at \$180,540.12, but of this amount \$82,764.12 is charged to the water department for the additional water supply which the proposed lighting plant would furnish the city. On this basis it is estimated that the 648,000 kilowatt hours will cost the city \$21,818.64 a year, including all cost of operating, sinking fund, interest on bonds, etc. The report was figured on the flow of water in 1909-1910, the lowest water Baker has experienced in the last decade. Commissioner Finley was empowered to employ an expert to check Mr. Stockman's report.

FIRE AND POLICE

Propose Fire Course in Missouri Schools.

Jefferson City, Mo.—A law requiring the teachings of fire prevention in the public schools at least two hours each week is one of the recommendations to the Legislature of the commission appointed by Governor Major to recommend a revision of the fire insurance laws. The commission found, its report says, that a great deal of the present trouble over fire insurance rates in Missouri is due primarily to the excessive fire loss. It says that a big percentage of the fires that now occur could be prevented by a campaign of education along the lines of prevention. It says the place to start that campaign is with the school children. The commission also will recommend that the office of fire marshal be created, who shall see that fire rules and regulations, especially in the cities, are rigidly enforced. A new proposal of the commission is for the state superintendent of insurance to have supervision over the character of fire agents. It says that much trouble is occasioned by fire agents writing risks they know are unsafe in order to obtain the premium. The plan of the commission would give the insurance commissioner authority to revoke licenses. E. F. Goltra, of St. Louis, is chairman of the commission. It was appointed shortly after the state and the fire insurance companies had trouble over the threatened withdrawal of most of the fire companies from the state.

Firemen and Policemen to Get Workmen's Compensation.

Boston, Mass.—The issue that firemen and policemen are not entitled under the provisions of the Workmen's Compensation Act for compensation for injuries sustained during the performance of their duties is over-ruled in a decision issued by the Industrial Accident Board. The decision is of importance in that it affects every fireman and policeman in every city of the state that has accepted the provisions of the act. It was said at the headquarters of the board that every county and all but two cities of the commonwealth have come in under the act.

The decision of the arbitration committee is based on a New Bedford case. A hoseman of the fire department was thrown out of the hose wagon in an accident while responding to an alarm of fire. He sustained injuries from which he subsequently died. His widow made claim under the provisions of the Workmen's Compensation Act. The arbitration committee in a majority report allowed the widow compensation amounting to \$3,000. During the hearing by the committee the city solicitor of New Bedford raised the issue that policemen and firemen are not included in the list of employes of cities or towns entitled to compensation. The majority of the committees overrules that issue and quotes Section 6 of Chapter 8, Acts of 1913, as the law on which it bases its decision.

This act shall apply to all laborers, workmen and mechanics in the service of the commonwealth or of a county, city or town, or district having the power of taxation, under any

employment or contract of hire, expressed or implied, oral or written, including those employed in work done in performance of governmental duties as well as those employed in municipal enterprises conducted for gain or profit. For the purposes of this act all laborers, workmen and mechanics paid by the commonwealth but serving under boards or commissions exercising powers within defined districts, shall be deemed to be in the service of the commonwealth.

This is the first case in which the issue was raised. In the event of an appeal from this decision by the city of New Bedford the case can be reviewed by the industrial accident board. An appeal from that body can be taken to the supreme court.

Police in New "Social Service."

New York, N. Y.—Commissioner Woods has announced that the police department has joined forces with John A. Kingsbury, Commissioner of Charities, to relieve the unemployed. As their first step in the new adventure into "social service," the police will make a census in each precinct. Where the needy outnumber those who can aid them, the situation will be referred to a special bureau maintained at police headquarters by the Society for Improving the Conditions of the Poor and other outside organizations. This bureau will be in charge of Leroy Peterson, at one time a member of the Educational Committee of the Board of Estimate, and a former investigator for the Bureau of Municipal Research, who is acclaimed by Commissioner Kingsbury as a "social expert." Police inspectors and captains are to confer with churches, institutions and philanthropic societies in directing the work of the new bureau in the solution of the unemployed problem. Commissioner Woods explained that the new "police social service" was intended only for the relief of unemployed residents of this city and would not assist the professionally unemployed who might flock here from other cities. The police bureau will cooperate with the Municipal Employment Agency in efforts to find employment for the jobless. Commissioner Fetherston, of the street cleaning department, will also rely upon the precinct reports for his snow shovellers.

MOTOR VEHICLES

Springfield, Mass., Owns 69 Automobiles.

Springfield, Mass.—A list of the automobiles owned by the city has been compiled by Mayor John A. Denison, in compliance with the request of Carl O. Dustin, manager of the Springfield Bureau of Municipal Research. Including the motor-driven fire apparatus, the city owns 69 automobiles, used by the departments as follows: Fire, 25 gasoline and five electric pieces of apparatus and cars; department of streets and engineering, three trucks, four touring cars and four runabouts; water department, five trucks, five touring cars and one runabout; police department, three patrol cars, one touring car and one runabout; park department, two trucks, one touring car and three runabouts; school department, one truck and one touring car; building department, two runabouts; sealer of weights and measures, one runabout; assessors and treasurer, one touring car.

New Tractor Arrives.

Marietta, O.—The new tractor for the aerial truck of hose company No 1 has arrived from St. Louis and been tried out. The tractor was manufactured by the Robinson Fire Apparatus Manufacturing Co., of St. Louis, the same firm from which the big auto fire truck was purchased. The engine is of the latest model, and is 70 horse power. With the installation of the new tractor, all the apparatus of company No. 1 is motor equipped with the exception of the hose wagon.

New Police Patrol Accepted.

Waukegan, Ill.—The city council has formally accepted the fine new auto police patrol recently delivered by Thomas P. Jeffery company of Kenosha, Wis., for \$3,200. The patrol has been given a thorough trial by the city officials and has met with their hearty approval.

Meadville, Pa., Now Completely Motorized.

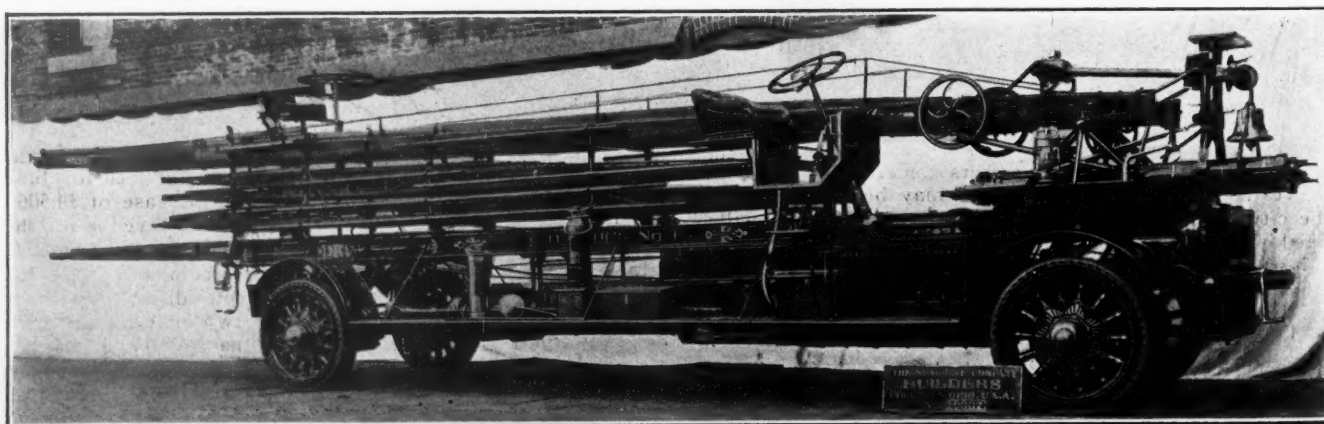
Meadville, Pa.—The two new pieces of apparatus which complete the motorizing of Meadville's department have arrived. The two trucks, chemical and hook and ladder, are equipped with American-La France four-cylinder 70 h.p. motor, and with the other features employed on the old truck which has given such satisfaction. In addition to the chemical tank capable of holding 50 gallons, the chemical wagon also contains 1,500 feet of hose, 1,000 feet being the new hose recently purchased by the city. Two 50-foot rapid hoist ladders and numerous scaling ladders are the equipment of the hook and ladder truck.

New Hook and Ladder Truck Received.

South Orange, N. J.—With the arrival of the motor hook-and-ladder truck, the equipment of the South Orange Village Fire Department has been completed. Besides the truck, which is a six-cylinder seventy-horsepower machine and cost \$6,200, a combination chemical and hose four-cylinder sixty-horsepower machine, costing \$3,700, has been installed. The truck has a thirty-five-gallon chemical tank and 250 feet of chemical hose, while the hose machine has a thirty-five-gallon chemical tank, carries 250 feet of chemical hose and has a capacity for 1,000 feet of regular hose. It is intended to dispose of all the horses and the horse-drawn vehicles, with the exception of one hose wagon, which will be kept for emergency purposes.

New Aerial for Duluth.

Duluth, Minn.—The new \$10,000 Seagrave aerial fire truck which has just arrived, is a notable addition to Duluth's fire-fighting equipment. The city now has fifteen motor units in all the fire halls in the city. Commissioner Hicken and Fire Chief Randall have tested the truck and found it satisfactory. A public demonstration of its work was given. The new truck is operated by a screw and spring method, which releases the aerial ladder and swings it up to a distance of seventy-five feet, holding it there by means of a weight and bar system. The ladder will reach the third floor of any building in the city. The type of truck is shown in the illustration.



Courtesy, Duluth (Minn.) Herald.

DULUTH'S NEW AERIAL.

GOVERNMENT AND FINANCE

Commission Form Defeated.

Salem, Ore.—By over 300 votes the charter for a commission form of government for this city was defeated at the regular city election.

Chicago Asks For Bids For Interest.

Chicago, Ill.—The city of Chicago, in accordance with an ordinance passed by the city council, has advertised for bids from regularly established banks for interest on city money for periods of thirty, sixty or ninety days. The assistant city comptroller, Louis E. Gosselin, announced that this will be the first time for the city to advertise for bids for time deposits.

Want City Manager Plan.

Elizabeth City, N. C.—Elizabeth City is planning to adopt the commission form of government with a city manager. The Board of Aldermen has adopted a resolution instructing the committee on amendments to the town charter to prepare a bill which will be introduced in the next session of the State Legislature to provide for a city manager.

City to Run on Cash Basis.

Kenosha, Wis.—Kenosha has begun paying cash for everything it gets with the understanding that a two per cent. cash discount will be secured on all bills. Every order for supplies through the city purchasing agent will be paid on presentation and two per cent. will be taken as the saving for the city. Ten thousand dollars a year is the saving that the city expects to make. In addition to this the purchasing agent has power to demand monthly settlements for all work done under contract, with the understanding that the city is to have the discount on all amounts the same as on amounts paid out for supplies.

Illinois Towns Petition for Commission Form.

Sterling, Ill.—The petition asking that the question of putting Sterling under a commission form of government be put to a vote has been completed and filed by the Commercial Club. There are 375 names on the petition.

Freeport, Ill.—A petition bearing approximately 550 names asking that the proposition of adopting the commission form of government for the city of Freeport be voted upon at an election, has been filed with the county clerk.

Rock Falls, Ill.—The voters of Rock Falls have filed a petition with the county judge asking him to call a special election in Rock Falls to vote on the commission form of government.

Virginia Cities Want City Managers.

Petersburg, Va.—The board of governors of the Petersburg Chamber of Commerce have adopted the report of a special committee recommending city manager plans of city government for Petersburg. The action of the board was unanimous in its decision to undertake as far as possible to lead in a campaign for the adoption of the plan. The plan provides for a commission of five members elected from the city at large whose term of service shall be four years for which they will receive a nominal salary. The plan also provides that this council or commission shall be elected by popular vote, the same as such officials as are required to be elected by the State Constitution and the commission will have the power to appoint other officers which will be done under civil service rules. All executive and administrative powers under the plan are to be vested in a city manager, who may be appointed from the city or from the country at large, whose salary will be fixed by the commission.

Portsmouth, Va.—Portsmouth will probably ask for a change in its charter to provide for the introduction of the city manager plan of government here. In a mass meeting a report of a special committee on the subject of a new form of municipal government was adopted, and instructions were given to the committee to go ahead with the preparation of a charter draft to be submitted to the people. The committee recommended a city manager, to have

charge of all departments, and name the heads. A council of ten members, with the mayor as president, was also recommended. The proposal is to deprive the mayor of veto power.

Roanoke, Va.—At a meeting of the Chamber of Commerce the city manager plan of municipal government, one of the three alternatives allowed the cities of Virginia by an act of legislature passed last winter, was voted unanimously. The vote was followed by the adoption of a motion authorizing the chamber's president to appoint a committee to take steps in bringing about an election.

Newport News, Va.—A mass meeting of citizens at the City Hall has endorsed the modified commission form of government under the new law. Steps were begun for bringing about the necessary election.

MISCELLANEOUS

\$500,000 City Farm.

Pasadena, Cal.—Pasadena owns a farm, the value of which is now conservatively estimated by the city auditor at \$474,300. The 529 acres of land and improvements are put down by City Auditor J. W. Prinz as worth \$465,000; the livestock figures in at \$2,500; tools, machinery and supplies, \$1,800; orange groves and walnut groves, \$5,000.

Municipal Pier Opened.

Atlantic City, N. J.—Ventnor celebrated the opening of its first municipal pier which cost \$25,000 and is the beginning of a much larger pier that will extend a half mile into the ocean when completed. The pier now consists of a thousand foot long decking, with a handsome auditorium at the front which can be used for conventions, dancing or other public gatherings.

City Challenges Power of Utilities Commission.

Grand Junction, Colo.—Preparations are being made by city officials to demand from the supreme court a ruling to settle the conflict in authority between the state public utilities commission and the city government over the right to regulate local public utility corporations. The city authorities contend that the special charter under which the city of Grand Junction operates is higher in authority than the public utilities act, but the commission maintains that its provisions are uniformly applicable to all parts of the state. A telephone ordinance and an ordinance to regulate street cars are now under consideration and will be affected by a court decision adverse to the city. Members of the local letter carriers' union are challenging the right of the Fruit Belt Railway to comply with the order of the utilities commission to refuse free street car rides to letter carriers in uniform. The city charter expressly provides that the mail men shall have passes on all street cars in the city.

Work of the Connecticut Utilities Commission.

Hartford, Conn.—The third annual report of the Public Utilities Commission has been submitted to the governor. Attention is again called to the recommendations made in the 1912 report that there should be enacted "a law which will effectively prohibit the merger or consolidation of public service companies without first obtaining the approval of the commission." There are 190 public service companies under its jurisdiction, including 29 electric, 13 gas, 17 gas and electric, 22 street railway and 86 water companies. The commission has collected information from the water companies to their methods of protecting water-sheds and supplies from contamination. The amount invested in plant and equipment by electric companies as calculated for June 30, 1914, amounted to \$14,811,784.85, an increase of \$4,506,453.33 over a year ago. The total operating revenue for the year was \$3,324,554.29, and the total operating expense, \$2,151,618.33. There were three less water companies than the previous year and five have given notice of discontinuance of business as public service companies; two of these being the Bristol Water Company and the Putnam Water Company, both municipalized. The total amount of capital invested in plant and equipment of the water companies was \$21,881,168.36, the total operating revenue was \$2,115,632.20 and the total operating expense \$899,715.26.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Trust Estates.

Jacobs et al. v. Steinbrink.—The principal of a trust estate is chargeable with expenses of improvements made necessary by municipal regulations, or where the property was in an unproductive and untenable condition when it came into the hands of the trustees.—Supreme Court, Appellate Division, Second Department, 149 N. Y. S. 337.

Ordinances—Publication—Necessity.

Schneider v. Atkinson.—A city ordinance, merely fixing the term of office of the city surveyor, as authorized by P. L. 1904, p. 151, relative to the term of office of certain officers in cities of the second class, did not involve an expenditure of money within a provision of the New Brunswick charter, requiring the publication of ordinances involving an expenditure of money.—Supreme Court of New Jersey, 92 A. R. 81.

Railroad Right of Way—Street Crossings.

City of Chicago et al. v. New York, C. & St. L. R. Co.—Under Illinois law a railroad company may locate its right of way in a city, including a way on or across streets without consulting the city, subject to the limitation that construction on or across a street may not be undertaken without the assent of the city; but, when the city in fact assents, the property right becomes as completely vested as if the grant had been direct from the sovereign.—Circuit Court of Appeals, Seventh Circuit, 216 F. R. 735.

Public Ways—Prescriptions.

Norfolk & W. Ry. Co. v. City of Bristol.—Where for more than 50 years the public had used a footpath across a railroad track at its intersection with a street as dedicated by the grantor of the railroad right of way, which path had been kept in repair, sometimes by the city and sometimes by the railroad, which use had been recognized by the railroad as a matter of right and not merely permissive, the city has acquired a way by prescription, regardless whether the original dedication was prior to the grant of the railroad right of way.—Supreme Court of Appeals of Virginia, 83 S. E. R. 421.

Condition of Bridges and Culverts—Duty of City.

Smith v. City of New Orleans.—The law imposes upon the city of New Orleans the mandatory duty of keeping its streets, and the bridges and coverings over gutters and ditches which form parts of the streets, in such condition as not to endanger the lives and limbs of those who use them; and, as such bridges and coverings, when made of wood, are subject to rapid decay, the proper discharge of that duty requires that they should be inspected periodically, and that the ascertainment of their dangerous condition should not be left either to chance observation or to resulting accidents; hence the failure to make such inspection, is negligence, for which the city may be held liable, in damages, to one sustaining injury thereby.—Supreme Court of Louisiana, 66 S. R. 319.

Ordinance—Partial Invalidity.

Kucharski v. Harrison, et al.—Where the City of Chicago, under Cities and Villages Act, §§ 73, 74, providing for City Councils and prescribing their powers, was authorized to create the offices of second deputy superintendent of police and inspector of moral conditions and to prescribe their duties and powers, the provision of the ordinance creating such offices that the second deputy should not be a member of the police force and the omission of both offices from the enumeration of officers designated as policemen, even if invalid, would not invalidate the ordinance creating such offices, under the rule that, although part of an ordinance is invalid, the other part may be valid, unless all the provisions are so connected and so dependent as to warrant the belief that the legislative body would not have passed the valid part independently of the invalid part.—Supreme Court of Illinois, 106 N. E. R. 488.

Public Improvements—Ordinances—Sufficiency.

City of Pana v. Baldwin.—An ordinance providing for the improvement of streets and for returns and approaches sufficiently fixed the grade of such returns and approaches, where it was apparent that they were extensions in street and alley intersections and were described and provided for in the plans and profiles made part of the ordinance.—Supreme Court of Illinois, 106 N. E. R. 454.

Railroads—Street Crossings—Right to Use—Viaduct.

Ward, Commissioner of Public Works, v. Erie R. Co.—A resolution granting permission to a railroad company to construct its road across city streets, "subject to the future control and pleasure of the common council * * * with respect to said crossings," did not reserve any right in the council to require the construction or maintenance of such a viaduct as the subsequent development of the city made necessary.—Supreme Court, Special Term, Erie County, 149 N. Y. S. 717.

Railroads—Right of Way—Control of Streets.

Omaha L. & B. R. R. Co. v. City of Lincoln.—The city authorities have control of its streets, and have power "to compel railways to conform tracks to grades at any time established." When the city has established the grade of a street the courts will not interfere with such action unless it clearly appears that thereby the rights of others have been seriously injured, and that such injuries are so wholly unnecessary that no reasonable mind could entertain a contrary belief. The provisions of section 5942, Rev. St. 1913, do not alter this rule.—Supreme Court of Nebraska, 149 N. W. R. 319.

Public Improvements—Enforcement of Assessments—Decree of Sale.

Beasley v. Bratcher.—A judgment condemning property to be sold for delinquent improvement taxes, which set forth the amount found to be due in figures, without prefixing the dollar mark, is not void as failing to show that it was a money judgment, the judgment showing on its face that the omission was a clerical misprision; especially where there was a confirmation of the sale which necessarily involved a finding that the land was sold for the correct amount due.—Supreme Court of Arkansas, 170 S. W. R. 249.

Public Improvements—Delay in Partial Payment—Interest.

Mechanics' Bank v. City of New York.—Where a city failed to make a payment on account, as required by the contract for a sewer, the contractor could either repudiate the contract and recover the contract for the work done, or could continue the work and sue for the past-due installment. When the contractor, after stopping work for some time, because of the failure of the city to make a partial payment when due, agreed to accept payment of the principal thereof, without reserving any rights to recover interest for the delay, he waived any right to such interest, which is the measure of damages for the delay.—Supreme Court, Appellate Division, Second Department, 149 N. Y. S. 784.

Ordinances—Amendment.

City of Henderson v. Kentucky Peerless Distilling Co.—Henderson City Ordinance, October 19, 1897, providing for the tapping of city sewers, prescribed the method by which the city's permission might be obtained, and required, inter alia, the payment of a fee of \$10. On June 13, 1901, an ordinance was passed entitled: "An ordinance to amend an ordinance entitled 'An ordinance regulating the tapping of sewers in the city of Henderson, and fixing the fee to be charged therefor,' passed October 19, 1897, and another ordinance or tax imposing a fee or tax for tapping of sewers." It contained but a single section providing that the ordinance regulating the tapping of sewers and fixing the fee to be charged therefor, passed October, 1897, and all other ordinances imposing a tax for the tapping of sewers, were repealed. Held, that such latter ordinance did not repeal the former, but only amended it so as to strike out the provision for the fee, leaving the balance of the original ordinance in operation.—Court of Appeals of Kentucky, 170 S. W. R. 210.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Dec. 26, 1914-Jan. 2, 1915.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—Annual meeting, Philadelphia, Pa. Permanent secretary, L. O. Howard, Smithsonian Institute, Washington, D. C.

Dec. 28-31.

AMERICAN ECONOMIC ASSOCIATION.—27th annual meeting, Princeton, N. J. Joint sessions with American Statistical Association and American Sociological Society.

Jan. 25-27.

LEAGUE OF WASHINGTON MUNICIPALITIES.—Fifth Annual Convention, Olympia, Wash. Secretary-Treasurer, Dr. Herman D. Brauer, Univ. of Washington, Seattle, Wash.

Jan. 26-28.

WESTERN SOCIETY OF ELECTRICAL INSPECTORS.—Annual meeting, Minneapolis, Minn. Secretary, W. S. Boyd, 76 W. Monroe St., Chicago, Ill.

Feb. 10-17, 1915.

EIGHTH CHICAGO CEMENT SHOW.—Coliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

May 10-14, 1915.

AMERICAN WATERWORKS ASSOCIATION.—Annual Convention Cincinnati, O. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 14-16, 1915.

SOUTHWESTERN WATERWORKS ASSOCIATION.—Annual Convention, Galveston, Tex. Secretary, F. L. Fulkerson, Waco, Tex.

Sept. 20-25, 1915.

INTERNATIONAL ENGINEERING CONGRESS.—Am. Soc. C. E., Am. Inst. Min. E., Am. Soc. Mech. E., Am. Inst. E. E. and Soc. N. A. & M. E., San Francisco, Cal. Secretary, W. A. Catell, Foxcroft Building, San Francisco, Cal.

GOOD ROADS CONGRESS AND CONVENTION OF AMERICAN ROAD BUILDERS' ASSOCIATION.

The eleventh annual convention of the American Road Builders' Association was formally opened at the International Amphitheatre, Chicago, Ill., by President M. A. McLean on November 15th.

Addresses of welcome were made on behalf of the city by L. E. McGann, commissioner of public works, Chicago, Ill., A. D. Gash, president of the Illinois Highway Commission, and John D. Shoop, of the Chicago Association of Commerce. President McLean in response expressed the thanks of the association for what had been done to make the convention a success.

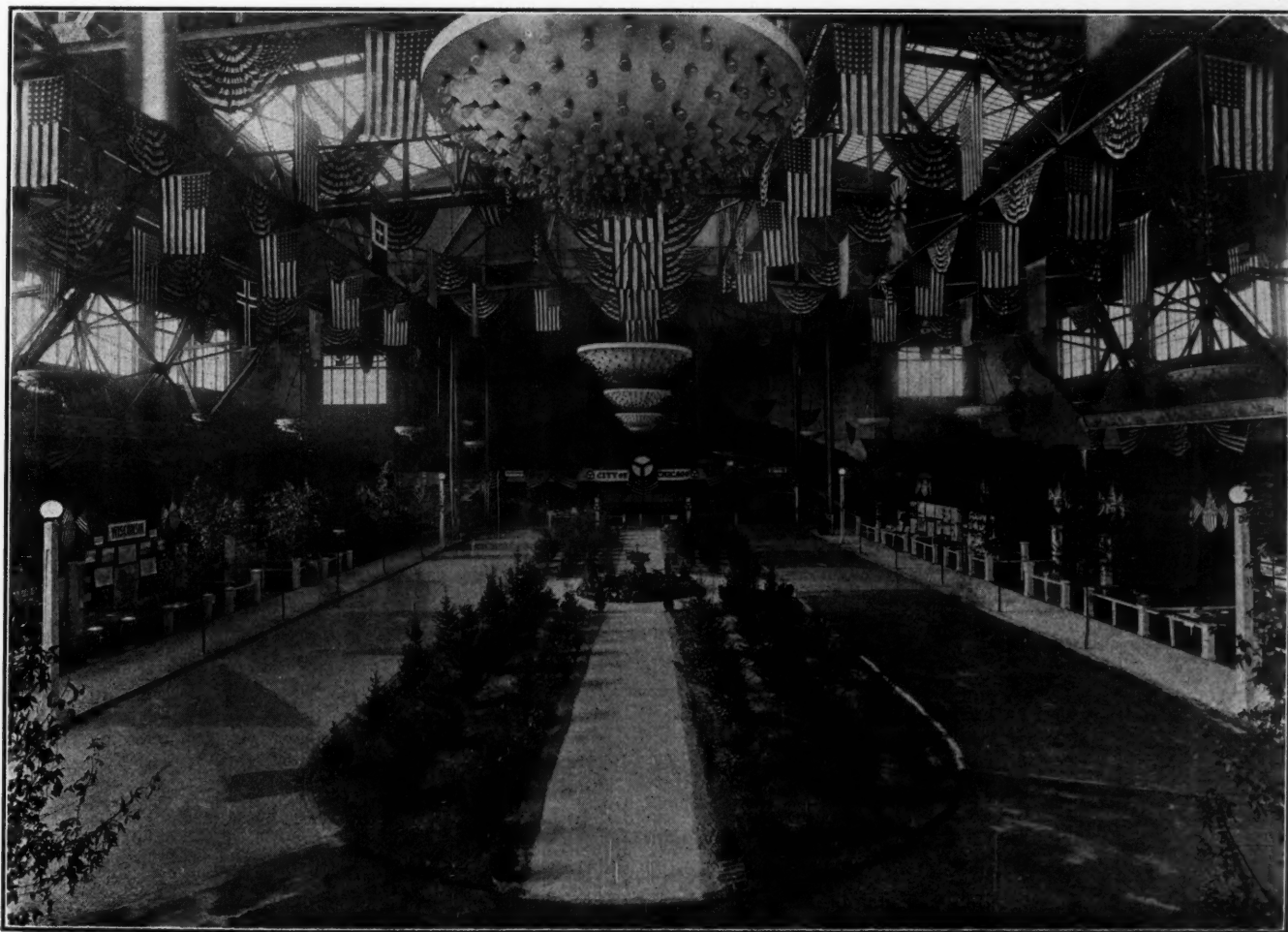
Other speakers at the opening session were Hon. Finlay G. MacDiarmid, minister of public works for the Province of Ontario, who discussed the problem of road building in Canada to-day; Wm. D. Sohler, chairman of the Massachusetts Highway Commission, on the needs of the trained engineer in highway work; Mayor H. C. Hocken, of Toronto, Canada, and Mayor Behman, of New Orleans. At the close of the opening session the following Committee on Resolutions was appointed: Nelson P. Lewis, chief engineer, Board of Estimate and Appor-

tionment, New York, N. Y., chairman; Paul D. Sargent, chief engineer, Maine State Highway Commission; Major W. W. Crosby, consulting engineer, Baltimore, Md.; A. W. Dean, chief engineer, Massachusetts Highway Commission; A. R. Hirst, state highway engineer of Wisconsin; Dr. Joseph Hyde Pratt, state geologist of North Carolina; T. H. MacDonald, state highway engineer of Iowa; James H. MacDonald, formerly state highway commissioner of Connecticut, and S. D. Foster, chief engineer, Pennsylvania State Highway Department.

The sixth annual Good Roads show held in conjunction with the eleventh annual convention of the American Road Builders' Association was formally declared open at 8 o'clock on December 15th, by president W. A. McLean, at the International Amphitheatre, Chicago, Ill.

The evening session was held under the auspices of the Association Road Organizations of Chicago and Cook County, with W. G. Edens, president, presiding. Among the speakers were Hon. Carter H. Harrison, mayor of Chicago; A. D. Gash, Nelson P. Lewis, W. G. Edens, Peter Reinberg, president Cook County commissioners, Homer J. Tice and R. J. Finnegan.

At the Wednesday forenoon meeting three important papers were presented: "Road and Pavement Dimensions—Widths, Depths and Crown," was read by the author, Linn White, chief engineer of the Board of South Park



SAMPLE PAVEMENT SURROUNDING PARK.

Commissioners, Chicago. Mr. White's paper was discussed by A. R. Hirst, who described the practice in Wisconsin in regard to the width, depth and crown of roads. James H. MacDonald, reviewing practice in Connecticut and touching briefly upon European road work.

"Road Foundations—Concrete, Telford, Gravel, etc.," was then presented by J. A. Johnson, Massachusetts Highway Commission, and discussed by Robert C. Terrell, commissioner of public roads of Kentucky, who took up the question from the viewpoint of the engineer working in the South where the conditions governing foundation work differ greatly from those obtaining in the North; C. A. Kenyon, president of the Indiana Good Roads Association; F. E. Ellis, manager of the Essex Trap Rock & Construction Co., of Peabody, Mass.; Mr. Johnston, Linn White and H. W. Durham, chief engineer of the Bureau of Highways, Borough of Manhattan, New York, N. Y.

The third session was called to order Wednesday afternoon by First Vice-President G. W. Tillson of New York. He introduced as the first speaker, John N. Carlisle, state highway commissioner of New York, whose paper was entitled, "Organization of a State Highway Department." The paper was discussed by Paul D. Sargent, S. E. Bradt, secretary of the Illinois State Highway Department, and W. O. Hotchkiss, state geologist of Wisconsin. "Traffic, Present Tendencies, Probable Development and Regulation," was covered in a paper presented by A. W. Dean. It was discussed by C. A. Kenyon. "Machinery for Construction and Maintenance—State, Municipal, Contractors, Traction Haulage of Stone, Care of Machinery—Instructions of Engineer and Operator," was presented by T. R. Agg, Professor of Highway Engineering, Iowa State College.

At a brief business meeting of the American Road Builders' Association, held at the close of the session, R. A. Meeker, state highway engineer of New Jersey; F. E. Ellis, C. A. Kenyon, Walter G. Leminger, superintendent of

streets of Chicago; G. A. Nelson, of Alabama; W. S. Gearhart, state highway engineer of Kansas, and W. D. Uhler, principal assistant engineer, Bureau of Highway and Street Cleaning, Philadelphia, Pa., were elected as nominating committee.

The annual banquet was held Wednesday evening at the Hotel La Salle.

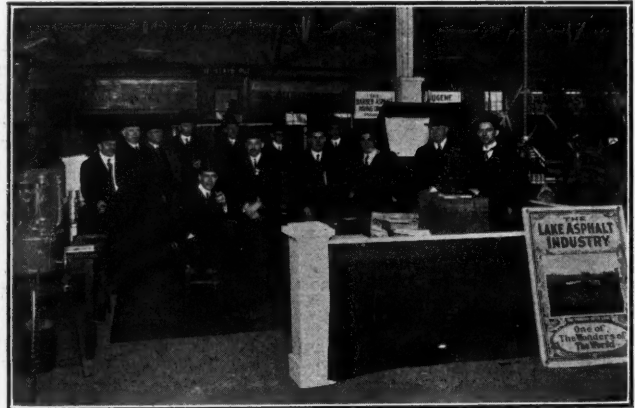
At the fourth session on Thursday morning John Laylin, of the Ohio State Highway Department, presented a paper on "Brick Roads and Streets." Among those who joined in the discussion were: Wm. A. Acheson, division engineer, New York State Highway Commission; Leonard S. Smith, head of the department of highway engineering at the University of Wisconsin; Major W. W. Crosby, Baltimore, Md.; E. H. Christ, city engineer of Grand Rapids, Mich., and E. A. James, engineer of York County, Ontario, Canada. This was followed by a paper on "Surface or Floors for Bridges," by Clifford Older, bridge engineer Illinois State Highway Department, which was discussed by John R. Chamberlin, Ohio State Highway Department; E. A. Byrne, Department of Bridges, New York City, and D. D. Price, state engineer of Nebraska.

The first paper of the fifth session was "Bituminous Construction and Maintenance," by Wm. D. Uhler. This was discussed by R. A. Meeker, E. A. Kanst, R. K. Compton, P. W. Henry, H. C. Hill and E. A. Sargent. H. J. Kuelling, Milwaukee County engineer, read a paper on "Concrete Roads," which brought forth comment by F. F. Rogers, state highway commissioner of Michigan; Henry G. Shirley, chief engineer of the Maryland State Roads Commission; P. C. McArdle, acting chief state highway engineer of Illinois, and Frank W. Pierson, street

commissioner of Wilmington, Del.

A business meeting was held at the close of this session at which reports were received from the Committees on Standards and Legislation.

Three papers of importance were presented at the Friday morning session, "Recent Practice in Construction in Wood and Granite Block," by W. A. Howell, engineer of streets, Newark, N. J.; "Present Practice in Earth and Gravel Road Construction and Maintenance," by Prof. Ira O. Baker, University of Illinois, and "Street Paving in Small Cities," by Thomas H. MacDonald. At the last session which



BARBER ASPHALT PAVING CO.'S EXHIBIT.

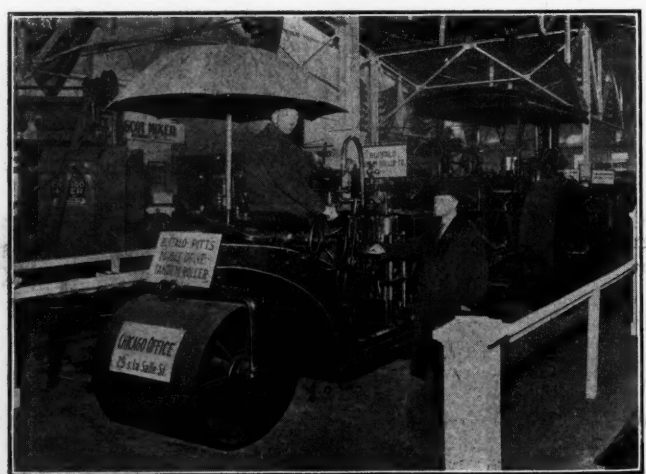
was held Friday afternoon, T. J. Ehrhart, state highway commissioner of Colorado, read a paper on "Convict Labor in Road Construction;" A. D. Williams, H. W. Bowlby, F. W. Bufum, C. M. Ken, and Joseph Hyde Pratt joined in the discussion. The session closed with a paper on "Dust Prevention and Street Cleaning," by C. O. Davis, superintendent of street cleaning, Milwaukee, and discussion by Wm. H. Connell, A. H. Blanchard and W. G. Leininger.

GOOD ROADS SHOW.

In many respects the exhibition is believed to have surpassed any which have been held previously. It was divided into sections—the arena, wherein were the general educational exhibits; the machinery section, in the north building, and the material section, in the south.



"ROCMAC" EXHIBIT OF WALTER T. HAINES.



A BUFFALO-PITTS ROLLER.

In the arena, at the east end of which was the main entrance to the show, was a small park with crushed stone walks, trees, shrubs and fountain. Surrounding the park was an elliptical boulevard, twenty feet wide and approximately four hundred feet in length, made up of sections of all the leading pavements in use to-day. (See illustration.) Each section was under the supervision of the company furnishing the materials. They were as follows: "Aztec" asphaltic concrete (U. S. Asphalt Refining Co.); "Taroid" macadam (F. J. Lewis & Co., Chicago, Ill.); brick and creosoted wood block using "Sarco" filler, and a concrete pavement surfaced with "Sarco" as-

showing the municipal forces repairing and resurfacing old pavements and views of the new municipal asphalt plant in operation. Also section of old macadam, brick and granite pavements before and after resurfacing with asphaltic concrete. Another interesting feature of this exhibit was an old macadam pavement which had been treated with asphalt recovered from the wearing surface of sheet asphalt pavements repaired by the city.

Surrounding the boulevard were the exhibits of the Office of Public Roads, U. S. Government, showing photographs and models of the successive steps in the construction of country roads in various parts of the country;

The United States Asphalt Refining Co.'s booth, in charge of J. R. Draney, sales manager, and J. R. Volk, Chicago representative, featuring Aztec asphalt, was at all times a rendezvous for paving men. Mexican flags, sombreros, hieroglyphics and photographs showing pavements laid in all the large cities of the United States and Mexico served as the main attractions at the exhibit.

F. J. Lewis Co., Chicago, exhibited samples of Taroid for use in tar macadam and pitch filler for brick or wood block pavements.

The Warner Quinlan Asphalt Co., New York, showed samples of Montezuma asphaltic cement.

The Burdick Enamel Sign Co., Chicago, showed signs in all colors for public and private use.

The Barrett Mfg. Co., New York, exhibit comprised a moving picture show of the construction of tarviated roads in various parts of the United States and Canada.

The Dunn Wire-Cut-Lug Brick Co., of Conneaut, Ohio, occupying booths 23 to 27 inclusive, lived up to their convention motto "A fresh carnation every day for everybody at every show." Their exhibit consisted of samples of their product as manufactured by each of the twenty-three licensees of this company, samples of a complete wire-cut-lug brick pavement, wire-cut hillside pavement, bevel brick for brow pavements adjacent to street-car rails, photographs of the proper construction of brick pavements and enlarged photographs of existing pavements in various parts of the country. The exhibit was in charge of F. B. Dunn, general manager, and his engineering corps consisting of W. C. Perkins, W. T. Blackburn, E. P. Schmidt and Frank T. Townsend. Miss B. E. Kinner, secretary, presided over the carnation table ably assisted by F. C. Churchill, publicity manager.

As is customary at all exhibits and conventions held for the purpose of boosting good roads and pavements, Warren Bros., of Boston, was repre-



EXHIBIT OF UNITED STATES ASPHALT REFINING CO.

phalt (Standard Asphalt and Rubber Co.); asphalt macadam constructed with "Standard" asphalt binder and brick pavement using "Standard" paving filler (Standard Oil Co.); asphalt macadam using "Bermudez" road asphalt, and asphaltic concrete using Trinidad lake asphalt (Barber Asphalt Paving Co.); "Warrenite" and "Bitustone" (Warren Bros.); "Tarvia" filled macadam, granite and limestone top (Barrett Mfg. Co.); Portland cement concrete (American Portland Cement Manufacturers' Association); Wire-Cut-Lug brick (Dunn Wire-Cut-Lug Brick Co.); "Kreolite" and "Hex" blocks (Jennison-Wright Co.); creosoted blocks (Ayer & Lord Tie Co., U. S. Wood Preserving Co., Kettle River Co. and Chicago Creosoting Co.), and granite blocks (Wisconsin Granite Co.). The curbing on both sides of the boulevard was built with Wainwright curb bars.

A boulevard lighting system was installed to carry out the idea and to facilitate travel, the blue enamel street signs having been furnished by the Burdick Enamel Sign Co. of Chicago.

At the west side of the park and adjoining the boulevard was the exhibit of the city of Chicago, installed under direction of Walter G. Leininger, superintendent of streets. Here were shown statistics relative to Chicago pavements, sections of the various pavements laid and method of construction, complete laboratory outfit used for testing materials purchased by the city, illuminated transparencies

of the Highway Commission of the Province of Ontario, Canada, and of the States of New York, Illinois, Wisconsin, Michigan and Arizona, showing photographs, maps and models of construction and materials. The cities of Richmond, Va., Philadelphia and New York were represented by interesting data and photographs.

In the material section were to be found exhibits of all kinds and that they proved popular was shown by the interested crowds which were to be found at all times in the booths.



EXHIBIT OF WARREN BROTHERS COMPANY.

sented by a most attractive exhibit. The booth was tastily decorated in colors, with a flashing electric sign announcing Bitulithic to the spectator. In the foreground were large box samples of Bitulithic, Bitustone and Endurite pavements for city streets, and Warrenite for country roads. Another feature, which was entirely new, was the saw used to cut samples of the various pavements, which was in operation at all times cutting samples for free distribution. Earl W. Pimm, manager of the Publicity Department, and F. G. Cutter, assistant to the president, were in charge of the exhibit, with a full corps of assistants.

The Philip Carey Co., Lockland, Cincinnati, O., showed a complete line of their Elastite paving joints, with sections of various pavements showing its application.

F. D. Cummer & Sons Co., Cleveland, had on display photographs and literature describing their road plant in operation in various cities.

The Universal Portland Cement Co., Chicago, as usual had a very complete exhibit of their product and its relation to the paving industry. In addition to the literature, diagrams, etc., usually shown by this company, the following features attracted attention: Section of concrete pavement taken up in Bellefontaine, Ohio, after having been in service twenty years; diagram showing that a number of cities are adopting concrete as a city pavement; models showing successive steps in the construction of concrete roads. Henry Royer was in charge.

The National Paving Brick Manufacturers' Association of Cleveland, represented by Chas. J. Deckman, president, Will P. Blair, secretary, H. H. McDonald, assistant secretary, and William P. Hansen, manager of the Paving Brick Publicity Bureau of Chicago, showed many interesting features relative to the paving brick industry, chief among which were the section of grout filled brick pavement removed by the U. S. Bureau of Standards from Columbus Ave., Sandusky, O., originally laid in 1894, and showing the advantage of the grout as a filler; also photographs of finished brick pavements and details of the construction, samples of paving brick from various parts of the country.

The Koehring Machine Co., Milwaukee, Wis., in their exhibit featured their paving mixers numbered 16 and 6.

The Rocmac Road Corporation of America exhibited a model road showing the use of their material, also photographs and literature.

The Bitumized Road Co., Kansas City, Mo., showed samples of their material, photographs and literature describing methods of construction and other interesting facts.

Buff & Buff Mfg. Co., Chicago and New York: surveying instruments, etc. Wheeling Corrugating Co., of Chicago: metal culverts.

Marquette Cement Mfg. Co.: photo-

graphs of state roads in Illinois and Wisconsin, motion pictures of manufacture of Portland cement, also photograph of Marquette Hill road, La Salle County, Ill., donated by the company and constructed under supervision of State Highway Commission.

John Baker, Jr.: samples of Texaco and California asphalt, also the "Maid of Texaco."

Robeson Process Co., New York, featured photographs of various state roads in the Atlantic States wherein their product was proving satisfactory, using such materials as gravel, red shale, limestone, slag or trap rock treated with Glutrin; a chemical laboratory showing chemical action of Glutrin and a physical laboratory showing tensile and impact tests of various materials bonded with Glutrin and unbonded.

Standard Asphalt & Rubber Co., Chicago, Ill., photographs and samples of Sarco asphalt for use in asphaltic concrete and filler; also fluxoil, asphalt binder, prepared expansion joints, cold coating for concrete pavements and Sarcolithic mineral rubber.

Association of American Portland Cement Manufacturers, Philadelphia: literature and diagrams of concrete roads, crowns, width, etc.

Barber Asphalt Paving Co. featured a miniature moving picture machine showing interesting views.

Other exhibits were as follows: Eugene Dietzgen Co., Chicago, Ill.: surveying instruments. Utility Road & Farm Machinery Co.: a Clark grader and trenching machine for tearing up old macadam streets and other hard materials. Kelly-Springfield Motor Co., Springfield, O.: motor trucks with special devices for dumping. Amies Road Co., Easton, Pa.; Amiesite, an asphaltic concrete with a cold mix, also model of construction. Illinois Stone Club: interesting booklet on stone and macadam pavements. Albrecht Excavator Co., Milwaukee, Wis.: new type of grader. Austin Western Machinery Co.: a new gasoline road roller. Baldwin Locomotive Works, Philadelphia: photographs of contractors' locomotives at interesting prices. Bausch & Lomb Optical Co., Rochester, N. Y.: surveying instruments. Blackmer Rotary Pump, Power & Mfg. Co., Petoskey, Mich.: pumping machinery. Bucyrus Co., South Milwaukee, Wis.: small steam shovel in operation handling stone. Buffalo Steam Roller Co., Buffalo, N. Y.: steam roller. J. I. Case Threshing Machine Co., Racine, Wis.: a complete line of contractors' machinery. Chain Belt Co., Milwaukee, Wis.: paving mixer in operation. Arrow Motor Cartage and Mfg. Co., Chicago, Ill.: Lee wagon loader. Chicago Portland Cement Co.: souvenir hand books on concrete construction. Domestic Engine and Pump Co., Shippenburg, Pa.: pumping outfits. Bonney Supply Co., Inc., Rochester, N. Y.: rapid wagon loader. The Eagle Wagon Works, Auburn, N. Y.: their

newest wagon. Erie Machine Shops, Erie, Pa.: new Erie steam roller. Galion Iron Works & Mfg. Co., Galion, Ohio.: illuminated transparencies of their products, models of same and motion pictures. Headley Good Roads Co., Philadelphia: samples of H. G. R. No. 1 and Bicomac, also their bituminous road planer. Huasteca Petroleum Co., New Orleans, La.: samples of crude and refined Mexican asphalt with penetration and ductility tests for same. Robt. W. Hunt & Co., Chicago, Ill.: photographs showing their facilities for inspection and supervision of paving work. Ingersoll-Rand Co., Chicago, Ill.: portable gasoline air compressor with complete rock drilling outfit. International Motor Co., New York: 7-ton truck. Jaeger Machine Co., Columbus, Ohio: operation of the Jaeger paver-mixer. Thos. B. Jeffery Co., Kenosha, Wis.: their new Jeffery Quad. Jennison-Wright Co., Toledo, O.: a complete line of creosoted materials, Kreolite and Hex blocks, with a model of a complete treated timber bridge. Keuffel & Esser Co., Chicago: complete line of civil engineers' instruments and supplies. Knox Motor Co., Springfield, Mass.: photographs and literature of their tractor. Kinney Mfg. Co., Boston, Mass., represented by E. B. Neal: motor driven tank car for transporting and distributing bitumen and road oils, the interesting features of which are its capacity, heating and regulating devices, economical operation and distributing system. Marion Steam Shovel Co., Marion, O.: steam shovel. Marsh-Capron Mfg. Co., Chicago: their line of concrete machinery. N. S. Monroe & Sons, Arthur, Ill.: models of Jumbo road leveler and photographs and literature of their line. Municipal Engineering & Contracting Co., Chicago, Ill.: paving mixer in operation. Novo Engine Co., Lansing, Mich.: photographs and literature. Orr & Sembauer, Inc., Reading, Pa.: literature descriptive of their line. Power & Mining Machinery Co., Cudahy, Wis.: international paving mixer in operation. Orenstein-Arthur-Koppel Company, Koppel, Pa.: hauling outfits and photographs and literature descriptive of their line. Russel Grader Mfg. Co., Minneapolis, Minn.: road machinery and photographs. Semet-Solvay Co., Syracuse, N. Y.: model of a water-bound macadam road after treatment with granulated calcium chloride. A. Streich Bro. Co., Oshkosh, Wis.: their newest dump wagon. T. L. Smith Co., Milwaukee, Wis.: photographs and literature describing their concrete machinery. Steel Protected Concrete Co., Philadelphia: a model showing the construction of concrete curb using Wainwright steel protection. Thew Automatic Shovel Co., Lorain, Ohio: small steam shovel, photographs and literature. Troy Wagon Works, Troy, Ohio.: wagons and trailers. Turbine Sewer Machine Renovating Co., Milwaukee, Wis.: sewer cleaning machinery with photographs showing actual results. Trussed Concrete

Steel Co., Youngstown, Ohio; model of concrete roads showing construction with reinforcement and Kahn armor plates. M. P. Zimdorf: photographs of road machinery.

ASSOCIATION OF AMERICAN PORTLAND CEMENT MANUFACTURERS.

The twelfth annual meeting of the Association of American Portland Cement Manufacturers was held at the Hotel Biltmore, New York City, December 7th, 8th, 9th and 10th, 1914. Monday and Tuesday, the 7th and 8th, were devoted to committee meetings. The executive committee of the Association held its meeting in the afternoon and evening of December 8th. At this meeting full reports were made by the various committees of the association of their activities during the year. On Wednesday the entire session was devoted to business.

The following officers were elected for the ensuing year: President, John B. Lober (Vulcanite); vice-president, Robert S. Sinclair (Alson's); treasurer, Chas. F. Conn (Giant); secretary, Percy R. Wilson; assistant secretary, Lewis R. Ferguson; assistant secretary, W. D. Lober; Executive Committee: John R. Morron (Atlas), E. M. Young (Lehigh), G. S. Brown (Alpha), W. S. Mallory (Edison), John A. Miller (Dexter), F. W. Kelley (Helderberg), D. McCool (Newaygo), E. M. Hagar (Universal), R. H. Hughes (Crescent), R. W. Kelley (Virginia), Richard Hardy (Dixie), A. H. Craney, Jr. (Union Sand), L. T. Sunderland (Ash Grove), F. R. Bissell (Texas), F. P. Jones (Canada).

The membership of the association, totaling 67 members, was increased by the election of three new mills, as follows: Sandusky Portland Cement Co., Sandusky, Ohio; Ironton Portland Cement Co., Ironton, Ohio; St. Mary's Portland Cement Co., Ltd., St. Mary's, Ontario, Canada.

The meeting was the largest in the history of the association, more mills being represented, and at the dinner, held on the evening of December 9th, there were 165 present. There were no speeches at the dinner, but the moving picture films which have lately been taken up, illustrating the various phases of concrete work, were shown to the members for the first time, and were received with enthusiasm.

On Thursday three papers were presented to the association, as follows: Transaction of the German Portland Cement Manufacturers Association, R. W. Lesley and E. L. Conwell; Organization and Work of the New York State Highway Department; George A. Ricker, First Deputy Commissioner, N. Y. State Highway Commission; Testing and Handling of Aggregates for Concrete, H. S. Mattimore, Assistant Engineer, N. Y. State Highway Commission.

The work of the association along all lines of endeavor for increasing the consumption of Portland Cement

will be continued as heretofore. It was decided that the next meeting of the association would be held at the Hotel Blackstone, Chicago, Ill., May 10, 11, 12 and 13, 1915.

PERSONALS

James Riddle, superintendent of road construction at Tampa, Fla., has resigned. County Engineer George Fuchs will take over Mr. Riddle's work in addition to his own.

Edgar Bedford, chief of the Sheboygan fire department, has tendered his resignation verbally, to take effect Jan. 1. It is understood that he will be succeeded by Wm. Trotter of Milwaukee.

Dr. J. E. Robinson has been appointed health officer of Temple, Texas.

T. D. Ward, commissioner of public accounts, has been appointed commissioner of parks and public works to succeed August Euhlinger, who will succeed Mr. Ward as commissioner of accounts.

Capt. J. W. Brady, for many years street commissioner of El Paso, Texas, has resigned on account of ill health. Michael Mulcahy, assistant commissioner, was appointed as his successor.

Charles G. Hunt has been elected chief of the Augusta, Me., fire department. A banquet was given in his honor Dec. 1.

W. J. Hindley, mayor of Spokane, Wash., has resigned his office.

Robert Gwynne, Jr., mayor of Salem, Wis., died of asthma Dec. 2.

Alex. J. Barthell was elected by the city commissioners as chief of police. L. Redmond was also elected lieutenant.

George F. Giddings has been appointed chief clerk of the public utilities commissioners of Maine.

James M. Broughton has been elected chief of police of Portsmouth, Va., to succeed Major F. T. Tynan. With the office goes the title of major. Sergeant P. J. Wilson was elected captain and Patrolman Elliott, sergeant.

Nicholas S. Hill, Jr., consulting engineer, of 100 William St., N. Y., has formed a partnership with S. F. Ferguson, formerly president of Mackenzie, Quarrier & Ferguson, and will practice with him under the firm name of Nicholas S. Hill, Jr., and S. F. Ferguson. Mr. Ferguson will assume charge of the office management, finances and accounts of the firm, while Mr. Hill will attend to work of a technical nature.

L. G. McAneny and G. T. Kirby have been appointed by Mayor Mitchell as members of the recreation committee.

Wm. B. Landreth has been chosen by State Engineer-elect Frank M. Williams of New York as deputy State engineer. The position carries a salary of \$5,000.

W. A. Jordan, street commissioner of Punxsutawney, Pa., has resigned to accept a position with the Neal Granite and Marble Co.

The following officers have been elected:

New Bedford, Mass.—E. R. Hathaway, mayor; S. A. Goodfellow, E. R. Cronin, S. E. Bentley and G. G. Southworth, aldermen.

Northampton, Mass.—Wm. H. Feiker, mayor, re-elected; Clarence D. Chase, city clerk; George W. Clark, treasurer.

Holyoke, Mass.—John H. Woods, mayor, re-elected; Pierre Bonvouloir, city treasurer.

Pittsfield, Mass.—George W. Faulkner, mayor.

Newport, R. I.—Robert S. Burlingame, mayor.

Gardiner, Me.—R. E. Lamb, mayor. Quincy, Mass.—Chester I. Campbell, mayor.

Marlboro, Mass.—Thomas H. O'Halloran, mayor, re-elected.

Waltham, Mass.—Thomas F. Kearns, mayor, re-elected.

Fitchburg, Mass.—Benjamin A. Cook, mayor, re-elected.

St. Cloud, Fla.—W. H. Smith, mayor. La Fayette, Ga.—D. W. Herndon, mayor.

Winnipeg, Man.—R. D. Waugh, mayor.

Rossville, Ga.—D. H. Hixon, mayor; W. H. Stanley, clerk and collector; J. B. Henderson, J. F. Carroll and D. H. McDaniel, tax assessors; W. H. Henderson, C. E. Rhodes, S. Davis and Frank Beasy, councilmen.

Henderson, Ky.—Woodson Hopkins, city engineer.

Mt. Sterling, Ky.—Walter F. Crooks, county road supervisor.

Avon Park, Fla.—R. A. Swearingen, mayor.

Jacksonville, Fla.—Frank L. Dancy, president of city council; John H. Ek, councilman.

Spokane, Wash.—Samuel Glasgow has been elected mayor, to succeed W. J. Hindley, resigned.

Hermiston, Oregon.—F. C. Mackenzie, mayor; H. M. Straw, J. D. Watson and R. C. Todd, councilmen.

Portland, Me.—Wm. M. Ingraham, mayor; A. E. Waite, G. F. Feeney, F. J. Mitchell, T. E. Frates, F. D. Martin, J. H. Dooley, W. M. Howatt, D. H. Roberts and Charles F. W. Stockton, aldermen.

Manchester, N. H.—Harry W. Spaulding, mayor.

Camden, N. J.—David Jester, president of council; member of Park Commission, Harry Humphreys; member of Board of Health, W. B. M. Burrell.

Ocala, Fla.—John D. Robertson, mayor, re-elected; D. W. Tompkins, J. J. Gregg, J. M. Meffert and G. A. Nash were elected councilmen.

Hastings, Fla.—R. M. Burt, mayor; W. H. Wildman, G. W. Waller, E. E. Durkee and F. Bartlett, councilmen.

Lancaster, Pa.—City Controller, J. H. Rathfon; street commissioner, Chester W. Cummings; superintendent of the water department, Elmer K. Saylor; city solicitor, B. J. Myers, esq.; city engineer, Israel Carpenter; city clerk, Edwin S. Smeltz; chief of the fire department, William E. Johnson.

NEW APPLIANCES

THE DIONIC WATER TESTER. An Electrolytic Method for Determining Impurities in Water.

The detection and estimation of impurities dissolved in water have hitherto been carried out by chemical tests of more or less complexity, requiring skilled chemists and chemical apparatus. The Dionic water tester substitutes a simple electrical measurement of conductivity for the chemical reactions hitherto used. The working principle of the apparatus is based on the fact, established by Kohlrausch, that the conductivity of pure water containing any electrolytic substance in solution is due almost entirely to the dissolved substance and only to a negligible extent to the water itself. Provided the solution is very dilute, the conductivity is proportional to the percentage of the amount of substance dissolved. The tester is so simple that it may be operated by an unskilled person and will obtain accurate results and it is claimed to be so sensitive that it will detect and measure traces of impurity so small as to entirely escape chemical analysis. This invention of Messrs. Digby and Biggs has a wide use and it has already been successful in measuring hardness of water, leakage of cooling water into surface condensers, sewage pollution in rivers and minute traces of impurities in distilled water. The tester does not of course discriminate between one substance and another—it merely gives quantitative results.

The apparatus, as shown in the diagram, consists of a U-tube G containing the water under test, in which are A and B, electrodes for passing a current through the water. The electrodes are connected by wires to a direct-reading conductivity meter M and a continuous current hand-operated generator E, that by turning the handle W of the dynamo, a current is sent through the meter and the water in the conductivity tube. The pointer of the meter is deflected and comes to rest at some

point on the scale which directly indicates the conductivity of the tested water—the time necessary for the test is but two or three seconds. No calculation is required, as the scale reads directly in reciprocals of one megohm as the unit of conductivity. The tube is mounted on a strong teak stand. It is so constructed that by pouring water into funnel F and allowing it to overflow through the outlet pipes OO, every part of the tube is thoroughly washed out. When a high degree of accuracy is wanted corrections for temperature are made.

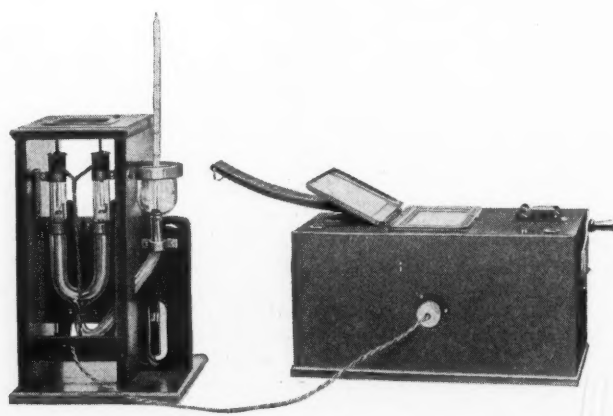
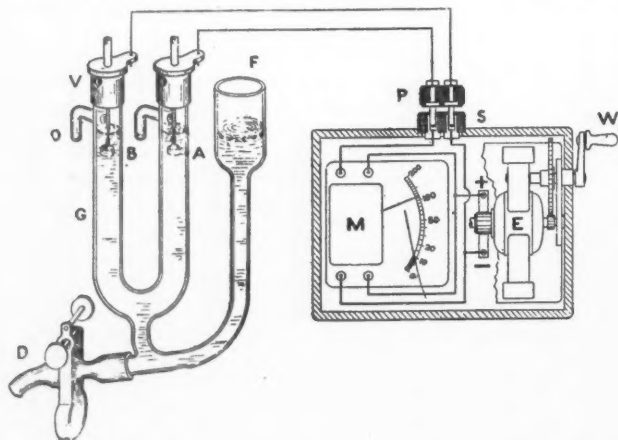
In testing water supply an analysis of water is made and at the same time a conductivity test. If at frequent intervals thereafter conductivity tests show constant results, there is no appreciable change in purity. In testing sewage pollution one test may be made at the outfall and the other below—the inspector carrying the apparatus and doing the tests on the spot. The tester is also used in determining the efficiency of sewage pumping processes. The Dionic water tester, illustrated here, is sold by James G. Bidle, 1211-1213 Arch street, Philadelphia, Pa.

MAZDA LAMP FIXTURES For Street Lighting Service.

The introduction of high candle-power Mazda lamps and the new conditions under which they operate required the design of an entire new line of fixtures to accommodate them properly. The five specific reasons that have induced the development of these distinctly different types of fixtures follow: The intense brilliancy of the lamp requires that the light source be screened in order to obviate all of the disadvantages from glare. The lamp in operation is designed to reach a very high temperature, and it is essential that the fixture be so ventilated that it is maintained at a temperature which will do it no injury. The lamp must be protected from moisture and

atmospheric changes. The shape and size of the bulb being different from that of previous standards of the vacuum lamp, it was necessary to make a fixture that would bring the light center to the correct location. Due to the fact that high-current series lamps operate at a very much greater efficiency, it is very desirable to provide an individual compensator in each lamp that will increase the current in the lamp from 6.6 or 7.5 amp. to 15 or 20 amp., as the 400 c-p. lamps operate at 15 amp. and the 600 and 1,000 c-p. lamps at 20 amp.

To provide for these contingencies, the General Electric Company, Schenectady, N. Y., has designed complete lines of street lighting fixtures that fill these requirements. In general these fixtures may be divided into three different classes: bracket type, pendant type and ornamental type. The bracket and center span suspension fixtures have been redesigned to accommodate the following reflecting equipment: radial wave reflector, concentric reflector or concentric reflector with prismatic refractor. The pendant units have been designed in two different classes, known as Form 1 and Form 2, both illustrated here. The Form 1 unit has been designed to resemble the arc lamp in general contour and appearance. It has a very substantial construction throughout. These units can be furnished with an opal diffusing globe, an opal diffusing globe and concentric reflector, a prismatic refractor and clear globe or a prismatic refractor. The Form 2 pendant units are unique in appearance and cost less than the Form 1. They are arranged to use a diffusing globe, concentric reflector and diffusing globe, radial wave reflector or a concentric reflector and prismatic refractor. Both the Form 1 and Form 2 units are arranged to take a compensator which is mounted under the dome and inside of the casing. The ornamental Novalux Unit illustrated



DIGBY AND BIGGS DIONIC WATER TESTER.

here, has been designed to fill the demand for a highly ornamental unit where "White Way" lighting is desired; and two different styles of ornamental units, known as the Forms 4 and 5, have been standardized.

Light distribution from a bare incandescent lamp is not suitable for street illumination. By using the various forms of fixtures equipped with reflectors and outer globes this distribution although at a decrease in specific consumption is improved to such an extent that the illumination is more economical. It was not, however, until the introduction of the prismatic refractor that the distribution from incandescent units could be so directed as to produce a decided maximum at an angle approximately 10 degrees below the horizontal. With such a distribution, it is now possible to increase the spacing of these lighting units, without destroying the even illuminating effect that heretofore could only be accomplished with incandescent lamps by using a number of comparatively low candle-power units.

The accompanying distribution curve gives a graphic idea of the improvement given by the prismatic refractor. The refractor used in these lamps consists of two sections, one fitting inside the other. The inner section is girdled by a succession of horizontal prisms, which converge the light rays into the most useful zone;

while the outer globe is lined with a series of vertical prisms, which serve to diffuse the light. The inner surface of the interior section and the outer surface of the exterior section are smooth; therefore, both sections when placed together and the top cemented present smooth outside surfaces, which facilitates cleaning, as they do not readily gather dirt and dust.

All fixtures described are suitable for all standard commercial circuits, both series and multiple.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—500 tons for Council Bluffs, Ia., were awarded to American Cast Iron Pipe Co. City of Chicago have just let for three lots of 2,500 tons each of small pipe. Quotations: 4-inch, \$25.50; 6 to 12-inch, \$23.50; 16-inch and up, \$23. Birmingham—There has been some increase in activity and operations are now on a 60 or 70 per cent. scale. Quotations: 4-inch, \$20; 6-inch, \$18. New York—Providence, R. I., has opened bids for 900 tons of 4 to 16-inch. 225 tons from Newton, Mass., went to Standard C. I. Pipe & Foundry Co.; 25,000 tons for Detroit were awarded to the American Car & Foundry Co. which was not at first the low bidder, at \$21.45. Quotations: 6-inch, \$20 to \$20.50.

Lead.—Quotations: New York, \$3.80; St. Louis, \$3.675.

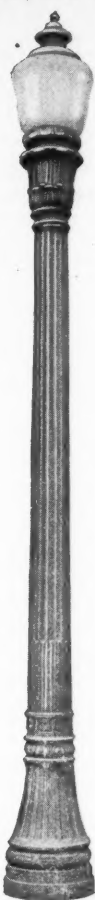
The Goodyear Tire & Rubber Co., Akron, O., announces that reports presented to stockholders at the annual meeting of the company disclose that 1914 was the most successful and satisfactory in the company's history. A 7 per cent. dividend on the preferred stock and 12 per cent. on the common stock were announced. In spite of the depression due to the war, cash on deposit and on hand has increased more than 150 per cent. The stockholders re-elected the directors, F. A. Seiberling, C. W. Seiberling, G. M. Stadelman, F. H. Adams, P. W. Litchfield,

H. B. Manton and J. P. Loomis—and the officers of the company were also re-elected, as follows: F. A. Seiberling, president and general manager; C. W. Seiberling, vice-president; G. M. Stadelman, secretary; F. H. Adams, treasurer; W. E. Palmer, assistant treasurer, and P. W. Litchfield, factory manager. President Seiberling, in his annual report to the stockholders, demonstrated that the company enters 1915 with greater strength and with brighter prospects than ever before.

Figures showing the tire production of the company for the past six years have recently been compiled. In 1909 Goodyear made and sold 102,669 tires; in 1910 the figures was 207,442; in 1911, 332,458 tires were made; in 1913, 1,132,869 was the number and in 1914 these figures were topped by a production of 1,478,396. This accounts only for the pneumatic tire production of the company.

The F. D. Cummer & Son Co., Cleveland, O., has just sold to R. L. Davis, contractor, at Tampa, Fla., Cummer road asphalt paving plant, to be used first at Tarpon Springs, Fla., for sand asphalt roads, and then on other contracts of asphalt macadam. This plant is a three-unit portable plant—heating, drying and mixing units—and has a capacity of 1,000 yards of 2-inch sand asphalt topping per day or the equivalent of street asphalt, asphalt macadam or Topeka mix. This is the fifth plant to be shipped south this season.

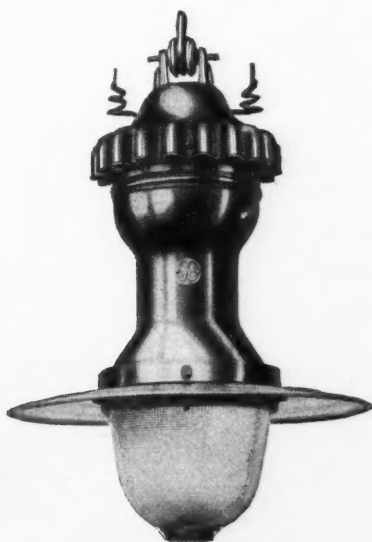
The H. W. Johns-Manville Co. announces that the pipe insulation contract for the new Utah State Capitol at Salt Lake City, for which R. K. A. Kletting was the architect, and Jas. C. Stewart Co., contractors, was recently awarded to the Johns-Manville Company. The high pressure pipes will be covered with J-M Asbesto-Sponge Felted Pipe Covering, a product made up of lamination of felt composed of asbestos and finely ground sponge. The materials being naturally cellular, they form the basis for the claim that this covering confines more "dead air" cells than any other covering—and therefore possesses a higher heat-insulating value. The heating pipes will be covered with J-M Asbestocel Pipe Covering, which is built up on the arch principle. Sealed air channels run around the pipe, instead of parallel with it, thus preventing the circulation of air and consequent heat radiation.



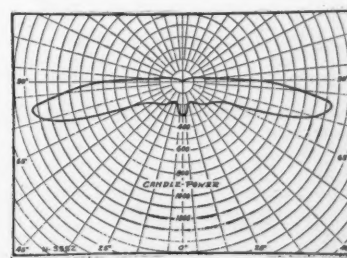
ORNAMENTAL
"NOVALUX"
UNIT.



"NOVALUX" FORM 2.



"NOVALUX" FORM 1.



DISTRIBUTION CURVE WITH PRISMATIC REFLECTOR.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
O.	Columbus	Dec. 26	Approaches to bridge	County Commissioners
Ind.	South Bend	11 a.m. Dec. 28	7,425 ft. gravel road improvement	Clarence Sedgwick, Aud., St. Joseph Co.
Ind.	New Castle	Dec. 28	Gravel road	P. H. Wolford, Co. Aud.
Tex.	Bonham	Dec. 28	30 miles of road	Good Roads Comrs.
Tex.	Bonham	Dec. 28	29,300 tons of road gravel	Will Harkins, Co. Aud.
O.	Cleveland	Noon, Dec. 28	Retaining walls and brick walk	Board of Education.
Fla.	Tampa	Dec. 28	15 miles brick pavement	Hillsboro Co. Comr.
Pa.	Philadelphia	11 a.m., Dec. 28	Paving and paving materials	J. T. Dodges, Fairmount Park.
R. I.	Providence	2.15 p.m., Dec. 28	Paving with asphalt and bitulithic	Board of Contract & Supply.
N. Y.	New York	10.30 a.m., Dec. 28	Construction of portable asphalt plant	President, Borough Bronx
Mass.	Boston	Noon, Dec. 28	Bituminous macadam paving	L. K. Rourke, Comr. P. W.
O.	Cincinnati	Dec. 28	Brick paving	Dir. Pub. Serv.
Cal.	Los Angeles	Dec. 28	Excavation and road improvements	Board of Supervisors.
Cal.	Los Angeles	Dec. 28	Machinery for municipal asphalt paving plant	Board of Public Works.
N. Y.	New York	11 a.m., Dec. 29	Street improvements; sidewalk and curb construction	M. E. Connolly, Pres. Queens.
Md.	Baltimore	Noon, Dec. 29	Section of state road	State Roads Commission.
N. J.	Atlantic City	Dec. 30	Boulevard construction	Board Chosen Freeholders.
N. J.	Somers Point	Noon, Dec. 30	Improving Somers Point Boulevard	H. Nelson, Co. Engineer.
Fla.	Tavares	Dec. 31	200 miles road	Lake Co. Comr.
Cal.	Porterville	Jan. 1	Paving 33 streets	City Clerk.
Ind.	Ottumwa	Jan. 1	27,142 yds. brick resurfacing	J. P. Brady, City Engr.
Kan.	Kansas City	Jan. 1	17,000 sq. yds. rock asphalt on present base	City Engr.
Va.	Richmond	Jan. 2	Smooth paving	Administration Board.
N. J.	Long Branch	11 a.m., Jan. 4	Construction of shoulders and gutters	Board of Chosen Freeholders.
Ind.	Greencastle	2 p.m., Jan. 4	Macadam road construction	C. L. Airhart, Co. Aud.
Ind.	Williamsport	1 p.m., Jan. 4	Gravel road construction	Comrs. Warren County.
Ind.	Valparaiso	10 a.m., Jan. 4	Gravel road construction	C. A. Bachley, Co. Aud.
Ind.	Greenfield	10 a.m., Jan. 4	County roads	Comrs. Hancock County.
Ind.	Portland	10 a.m., Jan. 4	Stone road construction	Comrs. Jay County.
W. Va.	New Cumberland	Noon, Jan. 4	Road improvements	C. E. Grafton, Co. Rd. Engr.
O.	Youngstown	Noon, Jan. 4	Grading and paving streets	C. E. Anderson, Clerk.
Ind.	Franklin	2 p.m., Jan. 4	Paving and improving road	H. L. Knox, Aud. Jackson Co.
Ind.	Brownstown	1.30 p.m., Jan. 4	Paving and improving roads, three jobs	A. Luedke, Aud. Jackson Co.
Ind.	Fowler	1 p.m., Jan. 4	Paving and improving roads	W. Mankey, Aud. Benton Co.
O.	Troy	10 a.m., Jan. 4	Concreting and macadamizing with asphalt binding 3,000 ft. of road	M. T. Staley, Aud. Miami Co.
Ind.	Alexandria	7.30 p.m., Jan. 4	Resurfacing with bitulithic	Sol. Weil, City Secy.
N. D.	Minot	4 p.m., Jan. 5	Graveling Park Road	H. E. Wheeler, Clerk.
Ind.	Monticello	10 a.m., Jan. 5	Paving and improving road	A. G. Fisher, Aud. White Co.
Ind.	Greensburg	1 p.m., Jan. 5	Grading and improving road, two jobs	L. W. Sand, Aud. Decatur Co.
Fla.	Bartow	Jan. 5	1 1/4 miles sand-oil roads	Bartow Co. Comrs.
Fla.	Palm Beach	2 p.m., Jan. 5	40,000 sq. yds. macadam; 29,900 sq. yds. rock surfacing	L. T. Lockwood, Council Pres.
N. Y.	Albany	1 p.m., Jan. 5	Improving highways in various counties	J. N. Carlisle, State Hy. Comr.
Kan.	Junction City	2 p.m., Jan. 5	5,000 sq. yds. 16-foot concrete roadway	Richard Rohrer, Co. Clk.
Ind.	Shelbyville	10 a.m., Jan. 6	Road improvement	Frank W. Fagel, Co. Aud.
Ind.	Rockville	11 a.m., Jan. 6	Gravel road construction	Comrs. of Parke County.
Ind.	Indianapolis	10 a.m., Jan. 6	Gravel and macadam roads	Board of Comrs.
Mich.	Crystal Falls	2 p.m., Jan. 6	10 1/2 miles earth road	Iron Co. Road Comrs.
Ind.	Muncie	10 a.m., Jan. 6	Gravel and crushed stone road work, two jobs	F. N. Williams, Aud. Delaware Co.
Ind.	New Albany	10 a.m., Jan. 7	Paving and improving road	J. T. Miller, Aud. Floyd Co.
Kan.	Paola	Jan. 7	Road construction	Comrs. of Miami Co.
Wis.	Kenosha	2 p.m., Jan. 8	Vit. brick paving with asphalt filler; concrete curb and gutter	Street Assessment Committee.
Ind.	Plymouth	2 p.m., Jan. 12	Grading, draining and paving with gravel	G. F. McCoy, Aud. Marshall Co.
Fla.	Bartow	2 p.m., Jan. 12	1 1/4 miles sand-oil road construction	J. A. Johnson, Clerk.
O.	Lima	Noon, Jan. 12	23,000 sq. yds. concrete roadway (readvertised)	Comrs. Allen County.
Ind.	Muncie	2 p.m., Jan. 12	9,900 ft. gravel road construction	Bd. Comrs. of Del. & Henry Cos.
Mont.	Great Falls	Jan. 12	Highway work	U. S. Reclamation Service.
O.	Galion	Noon, Jan. 13	Macadamizing road	C. O. Hibbing, Aud. Morrow Co.
Minn.	Ada	2 p.m., Jan. 15	Leveling roads; cost \$4,500	D. E. Fulton, Aud. Norman Co.
Mo.	Edina	Jan. 15	6 blocks vitrified brick pavement	Frank Gordon, Engr.
Ind.	Franklin	2.30 p.m., Jan. 15	County line road	H. L. Knox, Co. Aud.
O.	Shaker Heights, Cleveland	Noon, Jan. 19	Curbing, draining and paving streets	C. A. Palmer, Vil. Clk.
P. O.		Noon, Jan. 23	Two miles gravel road	Comrs. of Delaware & Henry Counties.
Ind.	Muncie	10 a.m., Jan. 23	Street improvement, macadam and granitoid pavements	Board of Public Works.
Ky.	New Albany	Jan. 28	Street improvement, macadam and granitoid pavements	J. Megurat, Aud., Wyandott Co.
O.	Upper Sandusky	Mar. 1	Fifteen miles water bound macadam	
SEWERAGE.				
R. I.	Providence	2.15 p.m., Dec. 28	Sewer materials	Board of Contract & Supply.
Mass.	Boston	Noon, Dec. 28	Building catch basins and sewers	L. K. Rourke, Comr. P. W.
Pa.	Philadelphia	Dec. 28	Constructing branch sewer	Director Public Works.
Tex.	Houston	10 a.m., Dec. 28	Drain ditch construction	H. L. Washburr, Aud. Harris Co.
Mass.	Westfield	11 a.m., Dec. 29	10,000 feet 6 to 24-inch sewer pipe	Board of Selectmen.
Ind.	Iowa Falls	1.30 p.m., Dec. 29	Sewer construction (readvertised)	E. L. Marriage, City Clk.
N. J.	Newark	Dec. 29	Central portion Section 17	Passaic Val. Sewerage Comm.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N Y.	New York	11 a.m., Dec. 30.	Manholes heads and covers, etc.	L. H. Pounds, Pres. Brooklyn Borough.
Ia.	Marengo	Noon, Dec. 30.	Drain ditch construction.	Chas. F. Zoff, Aud. Iowa Co.
Minn.	Granite Falls	9 a.m., Dec. 30.	Drain ditch construction.	S. O. Tjosvold, Aud. Yellow Medicine Co.
Wash.	Anacortes	Jan.	1. Lateral sewer, cost \$12,000.	City Council.
Fla.	Clearwater	Jan.	1. Sewer system and septic tank.	R. T. Daniels, City Clk.
Ill.	Lincoln	Jan.	2. 13,340 ft. drainage tile.	Directors Union Drain. Dist.
N. J.	Newark	Jan.	5. Central portion Section 18 main intercepting sewer.	Passaic Val. Sewerage Comm.
Fla.	Palm Beach	2 p.m., Jan.	5. 15,550 ft. 8-inch; 3,250 ft. 10-inch; 1,316 ft. 12-inch. sanitary sewers, with manholes, flush tanks and fittings.	L. T. Lockwood, Council Pres.
O.	Sabina	Noon, Jan.	6. Sanitary sewer construction.	P. H. Sparks, Vil. Clk.
O.	Shaker Heights, Cleveland			
Neb.	Talmage	10 a.m., Jan.	11. New channels for river	H. Damne, President.
N. J.	Newark	Jan.	12. Northerly portion Section 18.	Passaic Val. Sewerage Comm.
Ill.	Lockport	Jan.	15. Constructing 8½ miles 8 to 30-inch sewers.	Board Local Improvement.
Minn.	Ada	2 p.m., Jan.	15. Ditch construction	D. E. Fulton, Aud. Norman Co.
Md.	Kensington	8 p.m., Jan.	15. Construction of sewer system.	Mayor and Town Council.
I. O.		Noon, Jan.	19. Storm and sanitary sewer construction.	C. A. Palmer, Vil. Clk.
Mont.	Roundup	Feb.	1. Main sewer and disposal plant.	City Engineer.
O.	Upper Sandusky	Mar.	1. Ten ditches 40,000 ft. long, 8 to 24-inch tile.	J. Megurat, Aud. Wyandotte Co.

WATER SUPPLY.

N. Y.	New York	3 p.m., Dec.	28. Repairs to Ridgewood pumping station.	Wm. Williams, Comr.
B. C.	Hollyburn	Dec.	28. Installing water system.	G. H. Peake, Municipal Clk.
Mo.	St. Louis	Noon, Dec.	28. 250 sprinkling plugs.	J. B. Thomas, Ch. Supply Com.
R. I.	Providence	2.15 p.m., Dec.	28. Furnishing special castings.	Board of Contract & Supply.
B. C.	W. Vancouver	Noon, Dec.	28. Constructing the Sisters Creek water system, to cost about \$150,000.	C. H. Peeke, City Clk.
N. Y.	New York	2 p.m., Dec.	28. Dismantling and erecting pumping engines.	William Williams, Comr.
Kan.	Mulberry	7 p.m., Dec.	28. 3,500 ft. 2-inch pipe, 1,500 ft. 4-inch, 4 hydrant valves, specials.	John P. Pedroja, City Clk.
N. Y.	New York	11 a.m., Dec.	29. Lighting streets and parks in Boroughs of Queens, Richmond and Brooklyn.	William Williams, Comr.
Tex.	Corpus Christi	Dec.	29. Water works, consisting of pumping station, filter, 80,000 ft. 20-inch pipe, 250,000 gals. elevated steel tank.	F. J. Mulligan, City Secy.
Md.	Baltimore	Dec.	30. Pumping equipment	J. W. Armstrong, Engr.
Ind.	South Bend	10 a.m., Dec.	30. 300 to 800 tons c. i. water pipe.	Board Public Works.
Ill.	Wilmington	7.30 p.m., Dec.	30. Elevated tank	L. Momen, City Clerk.
Mass.	Boston	Dec.	31. Dent Street brook conduit.	L. K. Rourke, Comr. P. W.
N. J.	Atlantic City	Dec.	31. Improvements to public water supply system.	L. Van Gilder, Supt. & Engr.
Kan.	Fort Scott	Jan.	1. Water filtration system, 2,000,000 gallons capacity.	J. Burton, Supt. Water Wks.
Ill.	Area	Jan.	4. Elevated tank, pumping station and plant complete.	President, Bd. Trustees.
Wash.	Warden	Jan.	5. Construction of water works system.	City Clerk.
Tex.	Corpus Christi	Jan.	8. Extension of date of Dec. 29 for water supply system.	City Secretary.
O.	Napoleon	Noon, Jan.	9. Water supply and other equipment.	D. C. Brown, Secy.
Fla.	Clearwater	Jan.	15. Extensions to water works system.	R. T. Daniels, City Clk.
Md.	Kensington	8 p.m., Jan.	15. Construction of water system	Mayor and Town Council.
Kan.	Larned	Jan.	18. Two motor driven turbine pumps and other equipment.	L. D. Burgess, City Clk.
Kan.	Larned	Jan.	18. Water works and electric light and power plant.	L. D. Burgess, City Clk.
O.	Shaker Heights, Cleveland			
P. O.		Noon, Jan.	19. Water mains in streets.	C. A. Palmer, Vil. Clk.
Greece	Athens	1915, Mar.	30. Water supply for Athens and additional cities, estimated cost, \$14,000,000	Bur. of Foreign & Domestic Commerce, Wash., D. C.

LIGHTING AND POWER.

O.	Columbus	Noon, Dec.	26. Lead-covered and insulated cable.	B. L. Bargar, Dir. P. S.
N. Y.	New York	11 a.m., Dec.	28. 1,000 c. i. lamp posts.	William Williams, Comr.
Ind.	Indianapolis	10 a.m., Dec.	28. Furnishing electric current for lighting.	Comrs. of Marion County.
N. Y.	New York	11 a.m., Dec.	30. Gas lighting for the five boroughs.	Wm. Williams, Comr.
N. Y.	New York	11 a.m., Dec.	31. Furnishing electric current for use of high-pressure pumping systems, fire service.	Wm. Williams, Comr.
Ill.	Great Lakes	11 a.m., Jan.	2. Extensions to distribution system.	H. R. Sanford, Navy Dept., Washington, D. C.
Neb.	Grand Island	Noon, Jan.	2. Lighting court house and jail for one year.	Gus Newman, Co. Clerk.
O.	Napoleon	Noon, Jan.	9. Power building and electrical plant.	D. C. Brown, Secretary.
Ill.	West Hammond	8 p.m., Jan.	14. Overhead street lighting equipment	L. F. Mankowski, City Clk.
Kan.	Larned	Jan.	18. Electric light and power plant and water works.	L. D. Burgess, City Clk.

FIRE EQUIPMENT.

Ill.	Chicago	11 a.m., Dec.	26. Two-story fire engine house.	L. E. McGann, Comr. P. W.
D. C.	Wash. Barracks	11 a.m., Dec.	28. 700 ft. 2-inch fire hose.	Lieut.-Col. J. B. Houston, Depot Quartermaster.
Pa.	Philadelphia	Noon, Dec.	28. Erection of fire and police station.	Director Public Safety.
Ill.	Chicago	11 a.m., Dec.	28. 920 automobile tires and other equipment.	Jas. Gleason, Supt. Police.
Ind.	Bloomington	Dec.	29. \$40,000 fire station	H. Blakely, Clerk
Kan.	Horton	8 p.m., Dec.	29. 400 feet fire hose.	W. W. Wood, City Clerk.
N. Y.	New York	2.30 p.m., Dec.	30. Material for fire protection work on Randall's Island.	J. A. Kingsbury, Comr.
N. Y.	New York	10.30 a.m., Dec.	31. Cables and other supplies for fire alarm.	Robt. Adamson, Comr.
Cal.	Pasadena	10 a.m., Jan.	2. Two motor pumping engines; 3,000 ft. 2½-in. hose.	City Clerk.
Va.	Newport News	Jan.	4. Motor fire apparatus	W. J. Stowe, Chief
Pa.	Sharon	Jan.	4. Motor hose wagon	Fred Vanderholt, Chief.
Ill.	Chicago	Noon, Jan.	20. 40,000 ft. 1-inch rubber hose.	South Park Comrs.

BRIDGES.

O.	Columbus	Noon, Dec.	26. Approaches to bridges.	Board of County Comrs.
Mont.	Billings	Dec.	28. Two bridges, total cost \$77,000.	County Comrs.
Ill.	Lebanon	10 a.m., Dec.	28. Three steel and reinforced concrete bridges.	C. E. Chamberlain.
W. Va.	Morgantown	1.30 p.m., Dec.	28. 150-foot span reinforced concrete bridge, estimated cost, \$65,000	Co. Court of Monongalia Co.
Ill.	Belleville	Dec.	28. Three steel reinforced concrete bridges.	C. E. Chamberlain, Lebanon.
Tex.	Bonham	Noon, Dec.	28. Bridge work	Will Harkins, Aud. Fannin Co.
Md.	Baltimore	Noon, Dec.	29. 16-foot reinforced concrete bridge.	State Road Comm.
Ala.	Clayton	Dec.	29. Barbour Creek bridge	Comrs. Barbour County.
O.	Quincy	Noon, Dec.	29. Suspension foot bridge	W. J. Campbell, Twp. Clk.
Ala.	Eufaula	Dec.	29. Steel bridge with concrete floor.	County Board of Revenue.
O.	Lorain	1 p.m., Dec.	30.	Comrs. Lorain Co.
Minn.	Bemidji	10 a.m., Dec.	30. 183 corrugated metal culverts.	Auditors of Beltrami & Marshall Counties.
Neb.	Wahoo	Dec.	31. Steel bridge; repairs to ten bridges.	Comrs. Saunders Co.
N. S.	Annapolis	Dec.	31. Bridge and culvert construction.	Provincial Road Commission, Halifax
Neb.	Omaha	Noon, Jan.	2. Bridge construction for 1915.	Frank Dewey, Co. Clk.
Neb.	Omaha	Noon, Jan.	2. Construction and repair of bridges for 1915.	F. Dewey, Clk. Douglas Co.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. D.	Sherbrooke	2 p.m., Jan.	4..Construction of three bridges.....	G. J. Mustad, Aud. Steele Co.
Miss.	Greenville	Jan.	4..Construction of steel and wooden bridges.....	W. W. Miller, Clk.
Miss.	Greenville	Jan.	4..18 steel bridges, 3 wooden bridges.....	Washington Co. Bd. Supv.
N. J.	Freehold	Jan.	4..Resurfacing bridge.....	Board Chosen Freeholders.
La.	Lake Charles	Jan.	5..66 reinforced concrete bridges and culverts and a number of wooden structures.....	E. C. House, Secy. Calc. Jury.
S. D.	Howard	2 p.m., Jan.	5..Steel and concrete bridges for 1915.....	W. E. Leonard, Aud., Miner Co.
S. D.	De Smet	1 p.m., Jan.	5..Culverts for 1915.....	Wm. M. Look, Co. Aud.
S. D.	Clear Lake	2 p.m., Jan.	6..Bridge construction for 1915.....	A. L. Larson, Aud., Duel Co.
S. D.	Pierre	2 p.m., Jan.	6..Steel bridges for 1915.....	Co. Aud. Hughes
S. D.	Bison	Jan.	7..Bridges for 1915.....	Co.
Kan.	Paola	Jan.	7..Two bridges.....	Illa Benjamin, Co. Aud.
S. D.	Miller	Jan.	8..Bridges for 1915.....	Comrs. of Miami Co.
Kan.	Anthony	Noon, Jan.	11..Eleven concrete bridges from 20 to 300 ft. long.....	County Auditor.
Mont.	Great Falls	Jan.	12..Highway and pipe bridge, two span, 195 ft. long.....	R. P. Chevaux, Clk. Co. Com.
Neb.	Fairmont	Noon, Jan.	12..Bridges for 1915.....	U. S. Reclamation Service.
Neb.	Geneva	Noon, Jan.	12..Bridge construction for 1915.....	B. A. Lynn, County Clerk.
Neb.	Hastings	Jan.	14..Bridge construction for 1915.....	B. A. Lynn, Co. Clk.
Minn.	Ada	8 p.m., Jan.	15..27 bridges, 10 large and 30 small culverts.....	Co. Bd. Supv.
Minn.	Faribault	Feb.	10..Two bridges and one culvert.....	D. E. Fulton, Aud. Norman Co.
				City Clerk.

MISCELLANEOUS.

Cal.	Richmond	8 p.m., Dec.	28..Reinforced concrete wharf.....	A. C. Faris, City Clk.
Fla.	Jacksonville	Noon, Dec.	28..550 ft. of 42-inch corrugated iron culvert pipe.....	Port Comrs.
O.	Cleveland Heights	Dec.	28..Removal and disposal of garbage for three years.....	H. H. Canfield, Vil. Clk.
N. Y.	New York	11 a.m., Dec.	28..One gasoline motor truck.....	Patrick Jones, Supt. School Supplies
N. Y.	New York	10.30 a.m., Dec.	28..Four motor-driven fuel wagons.....	Robt. Adamson, Fire Comr.
N. Y.	New York	2.30 p.m., Dec.	28..Marine boilers.....	J. A. Kingsbury, Dept. Public Charities
R. I.	Providence	2.15 p.m., Dec.	28..Construction of band stand and auditorium.....	Board of Contract & Supply.
N. Y.	New York	Noon, Dec.	29..Furnishing office equipment.....	Board of Election.
N. Y.	New York	2.30 p.m., Dec.	29..Alterations to Ward pavilion.....	John A. Kingsbury, Comr. of Public Charities.
N. Y.	New York	2 p.m., Dec.	29..Construction of a tool house near Mt. Prospect reservoir.....	William Williams, Comr.
La.	New Orleans	Dec.	29..202,000 cu. yds. earth work.....	W. G. Caples, Maj. of Engrs.
N. Y.	Albany	2 p.m., Dec.	29..Electric wiring; also furniture and other equipment.....	Louis F. Pilcher, City Arch.
R. I.	Newport	10 a.m., Dec.	29..Automatic machinery.....	Samuel McGowan, Paymaster-General, Washington, D. C.
N. Y.	New York	Noon, Dec.	30..Alterations to Staten Island ferry house.....	R. A. C. Smith, Comr. of Docks
Fla.	St. Petersburg	Dec.	30..Drainage canal, cost \$100,000.....	Pinellas Park Drainage Assn.
N. Y.	New York	2 p.m., Dec.	31..Chloride of lime, liquid chlorine and copper sulphate.....	Wm. Williams, Comr.
N. Y.	New York	2 p.m., Dec.	31..Filling low places in Van Cortlandt Park.....	Park Commissioners.
Mont.	Bozeman	3 p.m., Jan.	2..Constructing U. S. Post Office.....	Supv. Architect, Washington.
D. C.	Washington	Jan.	4..Construction of Postoffice at La Junta, Col.....	O. Wenderoth, Supv. Archt.
Wis.	Fond du Lac	Jan.	4..Municipal buildings.....	M. J. Tappins, Secy.
Va.	Richmond	Noon, Jan.	4..Erection of police station.....	Board of Police Comrs.
Fla.	Palm Beach	2 p.m., Jan.	5..Construction of sea wall.....	L. T. Lockwood, Council Pres.
O.	Columbus	Noon, Jan.	5..Disposal of reduction plant product.....	G. A. Borden, Dir. Pub. Serv.
O.	Cincinnati	3 p.m., Jan.	5..Motor truck, ambulance; remodel old power house and other work.....	Board of Hospital Comrs.
Minn.	Osakis	Jan.	7..Public school.....	Board of Education.
D. C.	Washington	3 p.m., Feb.	8..Construction complete U. S. Post Office at Tiffin, Ohio.....	O. Wenderoth, Architect.
Ind.	Muncie	10 a.m., Jan.	9..Remodelling Orphan's Home.....	Board of Commissioners.
Mass.	Boston	11 a.m., Jan.	9..15 ton locomotive crane.....	H. R. Stanford, Chief Bureau, Navy Yard.
Fla.	Jacksonville	8 p.m., Jan.	11..Removal and disposal of dead animals.....	Committee on Public Works
Wash.	Puget Sound	10 a.m., Jan.	12..One automobile ambulance.....	Bur. of Sup. & Accts., Navy Dept., Washington.
Conn.	Stonington	2 p.m., Jan.	15..Repairs to breakwater.....	Maj. G. B. Pillsbury, New London.
Ind.	Gary	3 p.m., Jan.	15..Two-story post office.....	O. Wenderoth, Wash., D. C.
O.	Cincinnati	Jan.	16..Six-story court house, cost \$2,500,000.....	Geo. O. Deckebach, Secy.
D. C.	Washington	2 p.m., Jan.	22..Post office at Uvalde, Tex.....	O. Wenderoth, Wash., D. C.
Neb.	McCook	2 p.m., Jan.	26..U. S. Post Office.....	O. Wenderoth, Washington, D. C.
D. C.	Washington	Feb.	1..Public building, cost \$200,000.....	S. W. Stratton, Dir. Bureau of Standards.

STREETS AND ROADS

Birmingham, Ala.—Firm of Otto, Marx & Co. of Birmingham has purchased \$500,000 of bond issue recently voted by Hillsborough county, Florida, for building of highways.

Mobile, Ala.—An important report from County Highway Engineer Fay McClure has been made to Board of Revenue and Road Commissioners in which he figured that cost of improving north side of Spring Hill Ave., between Crichton and Moffat Road, would be \$2,077.50. He stated that cost of completing roads now under contract would be \$15,600, and recommended spending \$12,000 for oiling roads and \$5,000 additional for general maintenance of roads and ditches. He figured that with total of \$32,600 appropriated out of road bond fund there would be left \$5,775.37.

Vernon, Ala.—Special election will be held to vote on question of issuing road bonds in sum of \$75,000.

Colusa, Cal.—Second installment of State Highway bond issue of Colusa County, amounting to \$125,000, has been sold to First National Bank of Colusa for \$113,828.12½, leaving \$11,171.87½ for county to make up.

Fairfield, Cal.—Solano County Supervisors have sold \$50,000 worth of State Highway bonds, held by this county, to a San Francisco financial house, for \$6,645.50 and accrued interest. County still holds \$300,000 worth of highway bonds.

Martinez, Cal.—Petition for organization of Central Contra Costa Blvd. district, comprising towns of Lafayette, Morgan, Walnut Creek, Alamo, Danville and Tassajara has been filed and will be brought before Board of Supervisors on Dec. 28. Petition is signed by 450 voters who wish to bond themselves for construction of boulevard from tunnel to Livermore, a distance of 45 miles. Approximate cost of project is \$200,000.

Oakland, Cal.—After Commissioner of Streets Baccus had filed estimate of city's share in cost of improvement, amounting to \$11,200, city council finally passed ordinances ordering asphaltting of those portions of Oak, 8th and 11th Sts. leading to municipal auditorium at present unimproved and also portion of 16th St.

Salinas, Cal.—County Clerk T. P. Joy will receive bids until Jan. 5 for road coupon bonds in sum of \$570,000.

San Diego, Cal.—Resolutions have been adopted for improvement of various streets.

Longmont, Colo.—Council has ordered paving of four blocks in city with concrete—Main St., 4th to 5th, and Fourth Ave., Terry to Kimbark.

Wilmington, Del.—Council will grade 10th, 11th and King Sts., at estimated cost of \$25,000.

Wilmington, Del.—Two propositions for co-operating with New Hanover County in building of improved road to Carolina Beach from Wilmington have been made to Board of County Commissioners by

New Hanover Transit Co., the Wilmington Beach Corporation and the Kure Land & Development Co. Proposals of three companies will be considered by Board.

Jacksonville, Fla.—Parker St., from Beaver St. to Wambolt St., is to be paved to width of 40 ft. and shade trees are to be cut down.

Wallace, Ida.—Council will call special election for voting on issuing bonds for construction of approximately 20 blocks of paving, together with intersecting streets and alleys.

Alton, Ill.—Paving of 12th St. from Liberty to Warren St. has been recommended.

Alton, Ill.—A big movement for hard roads in Madison county has been launched.

Belleville, Ill.—Board of Supervisors of St. Clair Co. will construct concrete road 18 ft. wide from city limits to East St. Louis, distance of 1½ miles to Belleville.

Ottawa, Ill.—Residents of Ottawa Ave. have taken steps to have that thoroughfare, known as "boulevard," paved, and have so declared themselves to city commission.

Annapolis, Ind.—Phillips Lee Goldsborough, Governor; E. C. Harrington, Comptroller of the Treasury, and Murray Vandiver, Treasurer of the State of Maryland, in pursuance of Chapter 267 of the Acts of the General Assembly of Maryland of 1914, and resolution passed

by Board of Public Works on Nov. 13, 1914, will receive proposals for \$3,600,000 of the state roads loan of 1914, as follows: Series N, \$217,000, due Feb. 1, 1918; Series O, \$225,000, due Feb. 1, 1919; Series P, \$233,000, due Feb. 1, 1920; Series Q, \$244,000, due Feb. 1, 1921; Series R, \$253,000, due Feb. 1, 1922; Series S, \$263,000, due Feb. 1, 1923; Series T, \$275,000, due Feb. 1, 1924; Series U, \$285,000, due Feb. 1, 1925; Series V, \$296,000, due Feb. 1, 1926; Series W, \$308,000, due Feb. 1, 1927; Series X, \$321,000, due Feb. 1, 1928; Series Y, \$333,000, due Feb. 1, 1929; Series Z, \$347,000, due Feb. 1, 1930.

Bloomington, Ind.—F. Wild & Co., of Indianapolis, were successful bidders on \$8,000 worth of Clear Creek township pike road bonds for W. A. Ketchum et al road.

Indianapolis, Ind.—Board of Public Works has adopted resolutions for paving 18th St. from Gent Ave. to Parkway Blvd. at estimated cost of \$22,401.61, and Highland Pl. from 21st St. to Mariette drive at estimated cost of \$6,548. Plans have been ordered for paving Capitol Ave. from Merrill to McCarty Sts.

Lawrenceburg, Ind.—Issue of \$33,000 of Lawrenceburg free gravel road bonds have been sold to Breed, Elliot & Harrison, of Indianapolis, at premium bid of \$102 by County Treasurer Andrew J. Burke.

Richmond, Ind.—Resolutions have been adopted for following improvements: For improvement of South D St., by grading and graveling roadway and constructing cement curb, gutters and sidewalks 6 ft. wide on both sides of street, from S. 15th to 16th St.; for improvement of North J St. by constructing cement sidewalk 6 ft. wide on north side of street, from North 14th to 16th st., and for improvement of South 13th St., by constructing cement curb and gutter on both sides, from South E to H St.

Vincennes, Ind.—Petitions for paving of Fifth St. and for paving of Second St. have been filed with Board of Works at regular meeting and referred to City Engineer for plans and specifications.

Davenport, Ia.—Plans are being considered for paving of 51 streets and alleys at estimated total cost of \$409,943. Intersections will cost \$60,845, and excess grading will aggregate \$11,110. A. R. Boudinot is city engineer.

Junction City, Kan.—Bids will be received by Board of County Commissioners of Geary County until 2 p. m., Jan. 5, 1915, for construction of about 5,000 sq. yds. concrete roadway. Richard Rohrer is County Clerk.

Lexington, Ky.—Proposal will be considered next spring to submit to popular vote of citizens of Breathitt county proposition to vote bond issue of \$50,000 for initial work in giving of farmers of Breathitt county a good roads system.

Lexington, Ky.—Greenup county is taking the lead of Eastern Kentucky counties in matter of good roads, and its Fiscal Court has called election for Jan. 19 to vote a \$200,000 bond issue for purpose of rehabilitating entire road system of county.

Middlesboro, Ky.—Petition is being circulated in Bell County calling for vote on \$250,000 road bond issue, calling for election to be held February 13. Every voter called on in Middlesboro has signed petition. Work will start in early spring on building Bell County's part of the Boone Way if bond issue carries.

Platteville, Ky.—Petitions have been put in circulation for holding of election in Bell County on question of issuing \$250,000 in bonds for purpose of building modern macadam highways.

Baltimore, Md.—Ordinance has been introduced in Second Branch City Council for paving of 68 streets in the Annex. These streets will be paved with improved material by commissioners for opening streets out of annual \$500,000 appropriated out of Annex loan for the purpose.

Cumberland, Md.—Bids will be received by A. W. Straub, city clerk, for \$150,000 Cumberland city 4½ per cent paving bonds, issued for street paving in Cumberland. Bids must be in hands of city clerk at City Hall, Cumberland, Md., not later than 9.30 a. m., Jan. 6, 1915.

Lowell, Mass.—Plans for paving of Lowell Sts. have been adopted and presented to Municipal Council.

Flint, Mich.—Petitions are being received for paving of Detroit St.

Lapeer, Mich.—Commission has been appointed to circulate petitions asking that Board of Supervisors submit proposition to bond county for \$500,000 for

good roads. If plan is successful issue will go to people at spring election.

Meridian, Miss.—Resolution has been adopted fixing date of sale of \$50,000 good roads bond issue for Supervisors' district 1. Bids will be opened and bonds sold Jan. 6, 1915, at 2 p. m.

Quitman, Miss.—Town is considering question of issuing street and sidewalk improvement bonds in sum of \$10,000.

Chillicothe, Mo.—Resolution has been passed by City Council for paving of Polk St. from Elm St. to Broadway with brick. Bids will be advertised for and work will be begun as soon as weather will permit in spring.

Camden, N. J.—Ordinance has been passed directing paving of Thurman St., from Mt. Ephraim Ave. to Norris St.; Rose St., from Pear St. to Liberty St.; and 27th St., from Federal St. to Westfield Ave., with asphalt on a 6-in. concrete foundation. Also ordinance directing paving of Wright Ave., from Pennsylvania R. R. bridge east to Federal St.; 9th St., from Wright Ave. to Newton Ave.; Linden St., between 10th and 11th Sts., and Carter's Pl. with Belgian blocks on 6-in. concrete foundation.

Millburn, N. J.—Proposed road and storm sewer improvements for Wyoming section of Millburn will cost in neighborhood of \$95,000, according to figures presented to township committee by William Byrd of Short Hills.

Paterson, N. J.—Ordinance has been passed to lay out and open boulevard from 19th Ave. northerly to southerly boundary of Eastside Park, and also from East 31st St. northerly to Fourth Ave.

Passaic, N. J.—State Road Commissioner E. A. Stevens has sent letter to Passaic County Board of Freeholders, approving plan of making survey of Macopin Rd., the Midvale and Greenwood Lake Rds., the Paterson and Hamburg Turnpike, Wanaque Ave., Little Falls Turnpike, old High Mountain Rd. and Weasel Rd.

Passaic, N. J.—Road bonds in sum of \$748,000 will be sold at private sale by finance committee, and bonds in sum of \$125,000 will be advertised for sale.

Albany, N. Y.—Following are lowest bids received Dec. 10 by State Highway Commission, 55 Lancaster St., Albany, for construction of public highways by State aid:

Southern Blvd., Albany County, 1.59 mile—Langan Constr. Corp., Albany, \$39,993; Lathrop-Shea & Henwood Co., Buffalo, \$41,650; Wm. G. Fox, Saratoga Springs, \$42,007; Robt. I. Gleason, Albany, \$42,358.

Road 1220, Coeymans-Indian Fields, Part 2, Albany County, 6.70 miles—Saml. Beskin, Beacon, \$62,040; Municipal Asphalt Corp., \$65,953; Amos D. Bridges Sons, Inc., Hazardville, Conn., \$66,140; Jas. Anderson, Menada, \$66,741.

Road 5525, King Ferry-Poplar Ridge, Cayuga County, 4.58 miles—Henry P. Burgard, Fulton, \$54,990; Michael H. Ripton, Rochester, \$55,580; McGreevey, McGuigan & Baum Co., Elmira, \$56,860; John H. Gordon, Albany, \$56,907.

Road 1152, Smith Corners-Stockport Dock, Columbia County, 1.18 mile—Saml. Beskin, Beacon, \$12,643; John I. McDonald Contr. Co., Poughkeepsie, \$13,174; Marks Kearney, Hudson, \$13,199; Jas. Garafano & Sons, Mt. Vernon, \$13,959.

Road 1037A, Gowanda Village, Erie County, 0.39 mile—John I. McDonald Contr. Co., Poughkeepsie, \$18,805; Thos. Fitzgerald Co., Fredonia, \$18,972; Thos. Mahoney, Jamestown, \$18,986; H. L. Armando & Co., Boston, \$19,206.

Road 1067, Athol Springs-Hamburg, Erie County, 4.08 miles—Thos. F. Shaughnessy, Albany, \$93,560; Louis H. Gipp, Buffalo, \$95,190; J. B. Hurley, Inc., Fredonia, \$95,443; Busch & Percival, Buffalo, \$95,544.

Road 5530, Watertown City, Eastern Blvd., Jefferson County, 1.08 mile—Stanley Constr. Co., Troy, \$34,863; W. J. Kennedy, Utica, \$35,712; Lou B. Cleveland, Watertown, \$35,975.

Road 955, Chittenango Village, Seneca Turnpike, Madison County, 0.45 mile—Conroy & Nixdorf, Oneida, \$6,819; Padelford & King, Sherburne, \$6,848; Guy B. Dickson, Syracuse, \$7,064; Phelan & Sullivan, Utica, \$7,186.

Road 5529, Lyell Ave., Spencerport, Monroe County, .606 miles—Frank V. Brotsch Co., Rochester, \$74,666; Michael H. Ripton, Rochester, \$75,517; Ribstine-Holder Co., Inc., Rochester, \$75,794; P. H. Murray, Rochester, \$76,253.

Road 766 and 767, Pittsford-Elmira, Parts 1 and 2, Monroe County, 7.12 miles—Claude Ludington, Rochester, \$75,361; James Anderson, Albany, \$77,292; Newport Constr. Co., Herkimer, \$77,490; A. Brozos & Sons, Inc., Middletown, Conn., \$78,182.

Road 5498, Cornwall-West Point, Part 1, Orange County, 1.27 mile—James Garafano & Sons, Inc., Mt. Vernon, \$196,999; Moynihan Hoggins, Port Henry, \$199,962; Langan Constr. Co., Albany, \$203,153; Jas. Anderson, Menands, \$203,302.

Road 5469, Meridian Albion, Orleans County, 8.91 miles—Hembdt & Washington, Monticello, \$112,615; Frank E. Gore, New York, \$114,529; Sullivan Constr. Co., Syracuse, \$114,827; Elmer H. Brown, Hempstead, L. I., \$117,491.

Road 5526, Parish-Camden, Part 1, Oswego County, 4.79 miles—Spellman Oliver Co., Chateaugay, \$44,381; Dana W. Robbins, Inc., New York, \$45,614; Semper Bros., Watertown, \$45,727; Stanley Constr. Co., Buffalo, \$46,417.

Road 1145, Syracuse City, Englewood Ave., Onondaga County, 0.76 mile—C. T. Hookway, Syracuse, \$25,237; Jas. Garafano & Sons, Mt. Vernon, \$25,913; Guy B. Dickson, Syracuse, \$26,107; Patk. W. Mulderry, Albany, \$26,457.

Road 5519, Malta-Ballston Spa, Saratoga County, 3.75 miles—Municipal Asphalt Co., New York City, \$35,234; Lynden Contr., Corp., Albany, \$37,761; Saml. Beskin, Beacon, \$37,820; De Graafe & Hogeboom, Inc., Kingston, \$37,976.

Road 5517, Bath-Hammondport, Part 1, Steuben County, 4.27 miles—Frank J. Foote, Nunda, \$43,625; Greenfield Constr. Co., Hornell, \$44,803; Patk. Murray & son, Elmira, \$44,939; Bradley & Nolan, Corning, \$44,980.

Road 1219, Huntington-Amityville, Part 2, Suffolk County, 4.89 miles—Helling Bros., Lindenhurst, \$43,720; Murray & Gardiner, Center Moriches, \$45,287; M. J. Lahey, New York, \$45,346; Gifford Constr. Co., Jamaica, \$46,711.

Road 1218, Huntington-Townline-Farmingdale, Suffolk County, 1.27 mile—Helling Bros., Lindenhurst, \$12,980; Murray & Gardiner, Inc., Center Moriches, \$13,389; Hembdt & Washington, Monticello, \$13,632; David Falconer Constr. Co., Long Island City, \$14,207.

Auburn, N. Y.—All bids submitted for construction of 4.58 miles of state road between state highway and King Ferry have been rejected.

Cato, N. Y.—Board of Supervisors has authorized issuance of road improvement bonds in sum of \$10,500.

Cooperstown, N. Y.—Improvement of roads in Otsego Co. is planned. Sum of \$774,000 is available for this purpose.

Goshen, N. Y.—Resolution has been presented recommending advisability of widening state highways running through Orange county, so as to provide a driveway of gravel for horse-drawn vehicles on each side of macadam centers.

Herkimer, N. Y.—Board of Supervisors has authorized issuance of road improvement bonds in sum of \$300,000.

Jamaica, L. I., N. Y.—Petitions have been adopted for regulating and grading various streets.

Kingston, N. Y.—Board of Supervisors has granted application of Town Board of New Paltz for authority to issue \$4,000 of town bonds to pay town's proportion of cost of construction in that town of the New Paltz-Plattekill road No. 572.

Long Island City, L. I., N. Y.—Plan to widen Jackson Ave., from Cemetery lane to city boundary in Borough of Queens, is made subject of special report, which City Plan Committee has submitted to Board of Estimate.

Riverhead, L. I., N. Y.—Without their quotas of State aid ten towns in Suffolk County will spend total of \$373,823.25 for road work next year, according to figures filed with Supervisors. This is sum to be raised by local taxation. Sums to be received from State by each town will swell grand total several thousand dollars. In addition to amount different towns will raise locally and in addition to State aid, there will be many thousands of dollars spent on highway work, for there is to be no let up in campaign to build state and county highways, the county's share to be paid for by bond issues. Amounts to be raised by ten towns for general road work and bridges, machinery and miscellaneous are as follows: Easthampton, roads \$19,000; bridges \$150; Southampton roads, \$65,000; bridges \$4,000; Shelter Island roads \$3,000; bridges \$100; Southold roads \$27,000; bridges \$1,000; Riverhead roads \$22,000; bridges \$450; Brookhaven, roads, \$64,773.28; bridges \$2,000; Islip, roads, \$52,000; bridges \$2,000; Babylon roads, \$20,000; bridges \$2,655; Huntington, roads \$55,000; bridges \$3,000; Smithtown, roads, \$12,445.02; bridges \$200; total, roads \$340,218.25; bridges \$16,555.

Quaker Gap, N. C.—Citizens of Quaker Gap township, Stokes county, will vote Jan. 19 on question of issuing \$50,000

of bonds for building good roads in that township. Yadkin county is expected to ask for election on same question at early date.

Southport, N. C.—Brunswick county has sold \$35,000 in bonds for road improvement.

Cincinnati, O.—Ordinance to pave Vine St., from 12th to McMicken Ave., with wood block, at cost of \$62,330, has been passed under suspension of rules.

Cincinnati, O.—Resolutions have been adopted for improving of various streets.

Columbus, O.—John I. Miller, Supt. of Public Works, has recommended that state build boulevard around part of Buckeye Lake.

Dayton, O.—Additional Montgomery county highway bonds, in sum of \$24,700, have been sold to State Industrial Commission at Columbus by local board of county commissioners. Bonds are for brick improvements on Covington, Salem, New Troy and Cincinnati pikes. County Commissioners still have about \$11,000 worth of road bonds which will probably be purchased by State Industrial Commission.

Marietta, O.—County Commissioners have allowed and ordered constructed two miles of highway in Salem township, above Lower Salem Village.

Toledo, O.—Board of County Commissioners will sell on January 5 bonds in sum of \$192,602.09 for repairing and maintenance of improved roads in county. C. J. Sauzenbacher is Auditor.

Madill, Okla.—Improvement of about 100 miles of county roads will be ordered by Marshall county commissioners at their December meeting.

Sapulpa, Okla.—Election will be held shortly to vote on question of issuing highway improvement and railroad aid bonds in sum of \$200,000.

Eugene, Ore.—The \$38,000 bonds covering cost of paving several of city streets during summer have been awarded to George L. and J. A. McPherson, of Portland, whose bid was par and accrued interest and premium of 1 per cent.

Portland, Ore.—Bids for paving Ladd Ave., in Ladd Addition, have been received by council as follows: Asphalt pavement, Warren Construction Co., \$18,599; Oskar Huber, \$18,171; bitulithic redress, Warren Construction Co., \$17,438; Oskar Huber, \$15,468.

Erie, Pa.—A committee of Trans-Pennsylvania Good Roads Association has succeeded in getting Girard Council to sign agreement to bear part of cost of half a million dollar road improvement which is to run through Girard and connect Erie by magnificent highway with New York state and Ohio. The road will run from near Conneaut, O., along Ridge Rd. to Erie and thence along Buffalo Rd. to New York state.

Philadelphia, Pa.—All necessary plans are ready for expenditure of \$400,000 provided in \$11,300,000 loan for extension of Northeast Blvd. toward Torresdale. Boulevard is now being completed as far as Rhawn St., and is open for travel for 7 miles from Broad St. Present wide avenue is to be carried a short distance farther, when four branches will radiate from Poquessing Circle, at Solly St. These branches will extend on the line of Solly St., Bensalem Ave., Poquessing Ave. and Holme Ave., and it is latter route that has been urged for development first. From the Poquessing Circle the Torresdale extension will be carried through Pennypack Creek Park by bridge over Bustleton branch of the Pennsylvania Railroad and Wooden Bridge Run. Another bridge is necessary over Pennypack Creek. Boulevard branch will be continued on line of Welsh Rd. to Willets Rd. to Torresdale and through Brown farm. This extension will open up short route to Bristol pike and other sections of Bucks county.

West Reading, Pa.—Special election will be held Jan. 12 for voting on question of issuing street improvement bonds in sum of \$25,000.

Newport, R. I.—Board of Aldermen has passed resolution authorizing payment for two parcels of land that are needed for widening of section of Bath Rd.

Providence, R. I.—Plans for widening of North Main St. from Benefit St. to North Burial Ground, made after detailed surveys of the highway, have been completed by City Engineer's department and will be submitted to City Council committee on highways at its next meeting.

Woonsocket, R. I.—See "Miscellaneous."

Johnson City, Tenn.—About 60 miles of proposed macadam roads have been

surveyed. These roads all lead out from Johnson City. They will connect Sullivan, Carter and Unicoi Counties with Johnson City. The eighth, ninth, tenth, eleventh and twelfth civil districts of Washington County and the sixth civil district of Carter County compose the road improvement district. At last session of legislature a special road bill was passed under which this district has been formed. Plan is to issue \$300,000 in bonds and with proceeds roads will be built.

Bryan, Tex.—Special election will be held Dec. 30 for voting on question of issuing road bonds in sum of \$600,000.

Denison, Tex.—See "Miscellaneous."

Greenville, Tex.—Election has resulted in favor of issuing road bonds in sum of \$400,000. W. H. Heenly is County Auditor.

Temple, Tex.—Streets to be improved with the \$140,000 set aside by the commissioners' court out of the \$600,000 bond issue voted Jan. 15, have been designated with exception of one connecting road between 1st St. and 8th St. on South Side.

Texarkana, Tex.—According to estimate prepared by city's engineer, total number of square yards of street to be surfaced between curbs amounts to 214,436, 23,410 sq. yds. of this amount to be paved with creosoted wood blocks, this block pavement to be placed on Broad St. from Walnut to Laurel, and on Walnut, Elm, Vine and Pine Sts., south of Broad St. to Front St., and on Front St.

Norfolk, Va.—Board of Control and acting city engineer has decided to ask City Council for appropriation of \$3,000 with which to make needed repairs in Granby St., north of 12th st.

Centralia, Wash.—According to County Commissioner George Miller, stretch of road from Southwest Washington Fair Grounds to city limits of Chehalis will be hard-surfaced next year, making continuous pavement between the Twin Cities.

CONTRACTS AWARDED.

Birmingham, Ala.—By board of commissioners, to J. L. Mullarky, Birmingham, for paving Ensley Ave. from 19th to 22d St., and 19th St. from Ensley Ave. to Finney and Jones Survey, with asphaltic concrete, at estimated cost of \$10,000. Work includes 3,500 sq. yds. asphaltic concrete on 5-in. concrete base; 600 yds. brick gutter on 5-in. concrete base; 2,650 lin. ft. granite curb, 1,350 sq. yds. cement walk, 350 lin. ft. stone headers and 500 lin. ft. 15-ft. c.-i. pipe.

Cullman, Ala.—By Cullman County Commissioners, to Jordan & Phillips, at \$6,542, to grade, drain and surface with slag and chert about 1½ miles Bremen Rd. W. S. Keller is State Highway Engineer, Montgomery.

Linden, Ala.—By Marengo County Commissioners, to J. J. Dunnevant, at \$6,542, to construct state aid road. A. L. Hasty is Chairman County Board.

Ozark, Ala.—By Dale County Commissioners, to J. G. Brown Construction Co., at \$6,542, to build sand-clay road.

California.—By Advisory Board of Dept. of Eng. Highway Comm., Sacramento, for roads as follows: Imperial county, Div. 7, Route 12, Sec. B, to Rice & Dutcher, Imperial, Santa Barbara county, Div. 5, Route 2, Sec. E, to J. W. Calback, 1918 Broadway, San Diego.

San Diego, Cal.—For improvement of Goldfinch St., Reynard Way and State St., to M. D. Goodbody, at following bid: Excavation, per cu. yd., 32½ cts.; embankment, per cu. yd., 2 cts.; culverts, \$4,520.76; raising sewer manholes, \$5; cement curb, per lin. ft., 38 cts.; gutters, 14½ cts. per sq. ft.

Santa Ana, Cal.—Keene & Norton Co., of Los Angeles, at \$16,133.57, was successful bidder for grading to be done between Olive and Peralta. This section is known as Sec. 3 of Riverside Rd. and will join good roads work already done by county highway commission in Santa Ana Canyon. Other bidders were: George Wiegand, Lamada Park, \$16,410.85; Cahill Bros., \$17,376.93; Oscar Ford, Riverside, \$17,533.45; Brashear Burns Co., Los Angeles, \$17,550.35; Easley Construction Co., Corona, \$17,715.37; D. D. Chapman, Los Angeles, \$17,993.05; Hart & Dusey, Pasadena, \$18,175.57; Richard Rothwell, Los Angeles, \$19,091.70; H. E. Cox, Los Angeles, \$19,956.60; J. S. Hiland, Anaheim, \$22,170.20; Doran & Reed, San Diego, \$23,761.06.

Connecticut.—For State road work following contracts have been awarded by Connecticut Highway Comm. at Hartford, as follows: Bridgewater—To Kellogg & Gregory of Danbury, for about 16,140 ft.

of 4-in. native stone macadam, Southville Rd., \$18,000. Old Lyme—To Daniel F. Toomey, Norwalk, for bridge work at Lieutenant River, at \$8,125. Saybrook—To Leonardo Suzio, for construction of about 4,170 lin. ft. trap rock macadam on Deep River Rd., at \$9,488. Winchester—To John De Michiel & Bro., of Torrington, about 4,645 lin. ft. trap rock macadam on Lakeville Rd., at \$9,488. Lebanon—To F. A. Wilcox, of Norwich, for about 7,300 lin. ft. native stone macadam, on Creamery Hill Rd., at \$10,229. Chatham—To Leonardo Suzio, of Meriden, for about 5,240 lin. ft. trap rock macadam, Haddam Neck Rd., at \$8,000. Sherman—To Marcello Contr. Co., of Portsmouth, N. H., about 3,898 lin. ft. native stone macadam, on New Milford and Gaylordsville Rd., at \$7,408.

Brownstown, Ind.—For constructing gravel road in Grassy Fork Twp., Jackson Co., to McCammon & Rich, Brownstown, at \$10,443.

Fort Wayne, Ind.—Contract for stoning of Yellow River Rd. from Hanley west to point a half mile south of Arcolia has been let to Wilson & Mayo on bid of \$21,389. Engineer's estimate for the job was \$24,385.64. This makes the cost \$5,966.40 per mile. The other bids are as follows: Dean Ellison, Monroeville, \$21,996; H. B. Sark, Bluffton, \$22,870; Rohr & Williams, Fort Wayne, \$23,084.64; Harry V. Moore, Muncie, \$23,085; Bell & Hall, Logansport, \$23,187; Brooks & Co., Fort Wayne, \$23,486; F. H. Fuelling, Fort Wayne, \$23,557.90; J. C. O'Connor, Delphi, \$23,849; Jerome Chevilott, Baldwin, \$24,154.

Indianapolis, Ind.—Board of county commissioners have awarded to Perry McKinsey and Lawrence Jenkins contract to improve the Mud Creek Rd., in Lawrence Twp. The road is in northeast part of township, and is trifle less than three miles long. Work will cost \$8,000.

Kansas City, Kan.—To A. J. Armstrong contract by Wyandotte County Commissioners for macadamizing a strip of Leavenworth road 1½ mile long for \$0.50 a sq. yd.

Newton, Kan.—Bids for paving with concrete of alleys east and west of Main St. from Broadway to Seventh St. have been opened by Commission and contract awarded to Haeney Construction Co. This company bid 94 cts. per sq. yd. on concrete work and 35 cts. per sq. yd. on excavation work.

Covington, La.—For constructing roads contracts have been awarded as follows: 28.8 miles road to Pearl River, to Arthur Dotten, Houltville, \$24,068; 16½ miles, Covington to Franklinton Rd., to John P. Kennedy, Baton Rouge, at \$23,505; 14.4 miles, Covington to Bush Rd., to Boyd & Bradshaw, Columbia, Miss., at \$12,285.

Boston, Mass.—For bituminous macadam roadway in Herbert St., between Park St. and West Tremlett St., following bids were opened Dec. 11, 1914: Jas. Doherty, \$1,109.94; J. C. Coleman & Sons Co., \$1,144.40; Martino De Matteo, \$1,149.01; John F. Beatty, \$1,162.81; John F. Lynch, \$1,190.23; Wm. J. Rafferty Co., \$1,252; John Landis, \$1,392. Contract was awarded to James Doherty. Engineer's estimate, \$1,194.

St. Paul, Minn.—Lowest bid for grading Cook St., from Matilda Ave. to Western Ave., was that of Christ Johnson at \$1,168.

Aberdeen, Miss.—To E. E. Mave, of Amory, Miss., for street work, and I. F. Smith, of Amory, for county road work. G. E. Hauser is Engr., Aberdeen.

Aberdeen, Miss.—To T. F. Smith, Amory, Miss., at \$12,000 for grading, surfacing and paving with reinforced concrete Amory and Cotton Gin Rd.

Hammonton, N. J.—Contract to build long proposed road from Hammonton to Cumberland Co. line, via Wheat Rd., has been awarded to Burk & Bonham, whose bid for job was \$6,705.19, the lowest of twelve.

Montclair, N. J.—Contract for continuation of Highland Ave., north to town line, has been awarded to Cestone Construction Co. by Montclair town council. Bid, which was the lowest of seven, was \$19,757.

Hamilton, O.—For paving of Mt. Pleasant Pike for 3 miles to L. A. Dillon at \$53,987. Road will be paved with brick.

Richmond, O.—By Jefferson County, for macadam pavements on Adena and Hopedale Turnpike, to J. P. Liggett, Hopedale, at \$1,800.

Tulsa, Okla.—By city, to F. M. McCormick, for paving in Dist. Nos. 108, 109, 111 and 112, and to Municipal Paving Co., for paving in Dist. No. 113.

Portland, Ore.—To Oskar Huber, city, at \$17,000, for paving of East 30th St., Alberta St. to Ainsworth Ave.

Portland, Ore.—For paving with asphalt East 13th St. by City Council to Oscar Huber, Portland, at \$17,000.

Beaumont, Tex.—To Hanson Sons, Inc., a Glveston, for supply of about 30,000 cu. yds. of shell on bank at Sabine or Sabine Pass for \$0.64 a cu. yd.; on bank at Port Arthur for \$0.80, and on bank at Port Neches for \$0.95. Shell will be used in construction of Jefferson county roads.

Marshall, Tex.—By City Commission contract for paving of West Rusk St. to Bert Hahn Construction Co. of Dallas.

McKinney, Tex.—For constructing roads in Celina Dist. to J. Fred Smith, at about \$125,000.

San Antonio, Tex.—To Southwell-Reynolds Co. contract for paving section of North Flores St., between Houston and Romana Sts., with creosoted wood blocks for \$3.10 a sq. yd. Texas Bitulithic Co. will pave section between Romana and Laurel Sts. for \$2.48 a sq. yd., and O. C. Chapin section between Laurel St. and Woodlawn Ave. for \$1.81 a sq. yd.

Princeton, W. Va.—By Mercer County Commissioners, to Curtis-Ward Co., Princeton, to construct 50 additional miles road at cost of \$250,000.

SEWERAGE

Gadsden, Ala.—Council has made final ordinance for issue of \$30,000 in bonds for construction of sewers in West Gadsden.

Newcastle, Cal.—Newcastle has voted for sewer bond issue of \$2,500. Bonds are for purpose of allowing town to go ahead with completion and construction of its sewer system.

Ontario, Cal.—Council has accepted offer submitted by E. A. Parkford to sell city the 175-acre Stoner tract for sewer farm, bonds to amount of \$55,000 for which were carried some time ago by city. Price is \$225 per acre and Parkford claims that city will receive inside of 25 years not less than \$75,000 from the farm.

Stamford, Conn.—Report of special committee on sewage reduction has been presented to common council by H. J. Lamborn, a member of the committee. Report recommends acceptance of bid of Frederick N. Lewis, of New York City, \$59,876.82, which does not contemplate erection of public dock. Other bids, with item for dock eliminated, were: Suburban Engineering Co., New York, \$60,834.12; Young & Hyde, New York, \$75,659.73; Harris Construction Co., Stamford, \$77,078.56; W. B. Elyrich, Grantwood, N. J., \$78,885.28; Daly & Merritt, Port Chester, \$79,783.94.

Wilmington, Del.—Ordinance providing for \$75,000 worth of bonds for construction of 31st St. sewer, the trunk line in 2d ward, grading of East 10th St., and other projects, provides that bonds shall become payable in 1937 and 1938, and shall bear interest at rate of 4½ per cent. Proceeds of sale except premium are to be turned over to Street and Sewer Department.

Pablo Beach, Fla.—Sewer bonds in sum of \$25,000 will be sold at noon, Jan. 14, 1915, by bond trustees.

St. Augustine, Fla.—Unqualified endorsement has been given proposition to establish municipal sewerage system by Chamber of Commerce at special meeting held to discuss the question.

St. Augustine, Fla.—Bond issue is being considered for complete system of sewerage for city.

St. Augustine, Fla.—At special meeting of Chamber of Commerce to act upon resolutions endorsing issuing of bonds for municipal sewerage system and calling of bonding election members present heartily endorsed measure and resolutions were adopted.

Hammond, Ind.—Lake County will hold special election Jan. 30 on proposal to create sanitary district and use \$300,000 for channel to divert sewage from Lake Michigan. Sewage would be carried into Calumet-Sag branch of Chicago drainage canal. County Commissioners also were present and fixed boundaries of proposed district.

South Bend, Ind.—Board of Works is considering plan of calling meeting of merchants on Michigan St. to discuss feasibility of reconstructing sewer on street, from LaSalle Ave. to Division St.

Lake Charles, La.—Plan is being discussed for bettering drainage system of city.

Boston, Mass.—For pipe sewers and drains in Leslie St., Dorchester, and Jackson St., Hyde Park, following bids

were opened Dec. 16, 1914: Antony Cefalo, \$776.70; A. E. Daddario, \$1,040.90; John F. Corrigan, \$1,047.64; Peter Bompiani Co., \$1,139.72; Louis Balboni, \$1,214; John F. Lynch, \$1,238.80; Martino De Matteo, \$1,331.99.

Lawrence, Mass.—Petition from West End Improvement Society of Tower Hill, asking that trunk sewer be installed in western section of Tower Hill along Haverhill St., from vicinity of Congress St. to Perry Ave., will be presented to incoming municipal council.

Detroit, Mich.—A sewage purifying plant will be installed with \$50,000 sewer system of Belle Isle.

Flint, Mich.—Petitions have been received asking for construction of sewers in various streets.

Duluth, Minn.—Sewer plans have been submitted for new Duluth and Gary.

Dunellen, N. J.—Following are three lowest bids received for construction of borough's collecting sewerage system: H. K. Corbin & Co., New York, \$82,604.20; Bruno Pizzamenti, Seneca Falls, N. Y., \$84,115, and the DiNapoli Teriello Construction Co., of Hackensack, \$86,805.

Millburn, N. J.—See "Streets and Roads."

Bethlehem, N. Y.—Bill is being considered in Town Council which provides for issuance of sewer system bonds in sum of \$14,000.

Fredonia, N. Y.—Village Council is considering submitting to voters proposition to issue sewage disposal plant bonds in sum of \$50,000.

Jamaica, L. I., N. Y.—Petitions have been adopted for construction of sewers in various streets.

Mt. Morris, N. Y.—Village will vote on \$150,000 expenditure for sewerage and waterworks plants.

Mt. Morris, N. Y.—Proposition 5 to install sewerage system at cost of \$69,000 has been carried by majority of 153.

Rochester, N. Y.—Ordinance has been passed for construction of sanitary and storm water sewer in Main St. east.

Winston Salem, N. C.—The petition for formation of drainage district in Forsyth County is being circulated and petition was presented to Board of Aldermen with request that Mayor O. B. Eaton be authorized to sign it for city.

Columbus, O.—A syndicate of three Cincinnati firms—the Davies-Bertram Co., the German National Bank and J. C. Mayer & Co.—have been awarded Indianapolis Improvement bond issue and Southern relief sewer bond issue of \$104,000 at premiums of \$191 and \$636 respectively, by Columbus Sinking Fund Trustees. The Central Trust & Savings Co. and Tillotson & Walcott, Cleveland, were jointly awarded a \$65,000 sewer improvement bond issue at par value and interest plus \$286 to-day by Columbus Sinking Fund Trustees.

Coshocton, O.—Plans are being prepared by Consulting Engineers Chester & Fleming, Union Bank Bldg., Pittsburgh, Pa., for proposed sewerage disposal plant.

Lodi, O.—G. C. Rice, village clerk, will receive bids until Dec. 28 for following bonds: General sewer and sewerage disposal, \$15,000.

Sandusky, O.—Sewer bonds in sum of \$72,000 have been sold to R. L. Day Co., Boston, Mass.

Sandusky, O.—Sewer bonds in sum of \$1,500 will be sold until noon, Jan. 2, 1915. Funds will be used for constructing sewer in Monroe St. F. W. Baver is City Auditor.

Portland, Ore.—City Commissioner Dieck has recommended that bids for Willow St. extension of E. Stark St. trunk sewer be rejected.

Allentown, Pa.—Bids received for underground sewerage system in 14th Ward are being tabulated by City Engineer Weirbach.

Connellsville, Pa.—A sanitary sewer is to be laid on South Pittsburg St. and storm sewers on Poplar St. In North End and on part of 9th St., West Side, and bids are to be asked from usual private contractors.

Erie, Pa.—Ordinance has been passed providing for construction of 9-in. diameter lateral sanitary sewer in Wallace St., in city of Erie, Pa., extending from 21st St. south 200 ft. more or less, together with necessary house connections, and for construction of 9-in. diameter lateral sanitary sewer in Reed St., extending from 21st St. south 200 ft. more or less, together with necessary house connections. M. J. Henry is Clerk City Council.

Columbia, S. C.—Council has authorized city attorney to call election on bond issue of \$200,000 for sewerage purposes.

El Paso, Tex.—City will construct sewer to new county hospital.

El Paso, Tex.—County Commissioners have authorized city to start work at once on extending sewer line to new county hospital.

Texarkana, Tex.—Storm sewer system is to be installed.

Dayton, Va.—Election will be held Jan. 19 for voting on question of issuing water, sewerage and electric light bonds in sum of \$30,000.

Racine, Wis.—Council is in favor of issuing \$36,000 sewer bonds in addition to \$50,000 which people voted early this year.

Superior, Wis.—Resolution has been passed for construction of sewer in alley between Fisher and Catlin Aves.

Niagara Falls, Ont., Can.—City Council has approved plans of Engineer Anderson for trunk sewer along course of Muddy Run Creek at estimated cost of \$200,000. Plans are now being inspected by Engineer F. A. Dallion of Ontario Health Board and his decision is expected in few days. Trunk sewer proposition will not be voted on at municipal election on January 4th, as law requires that bylaw be advertised three weeks prior to election. Engineer Anderson said that special election would be necessary, if proposition is submitted to voters next year. Plans call for tunnel along course of creek, as far as Victoria Ave., with outlet at foot of Huron St. From that point on to Stanley and McRae Sts. plans call for two separate sewers, one to carry off sewage, the other to carry off surface water.

CONTRACTS AWARDED.

Stockton, Cal.—By City Council, for street paving, to A. B. Munson & Son, Stockton, at \$24,326.

Bradentown, Fla.—For constructing 1,470 lin. ft. reinforced concrete and segment block storm sewer and about 12,000 lin. ft. sanitary sewers to South Florida Eng. Co. and Bryan & Co., of Bradentown. W. H. Tracy is Comr. Pub. Wks.

Macon, Ga.—To Preston & Redding contract by Council for building sanitary sewer system in Macon's Tybee district for about \$3,750.

St. Charles, Ill.—For constructing sewer in E. 5th St., to H. D. Hallett, Aurora, Ill., at \$5,875.

Keota, Ia.—To Chas. E. Hughes, Rockford, Ill., at \$15,997 for construction of sewers and sewage disposal plant. Iowa Engineering Co., Clinton, Ia., are engineers.

Boston, Mass.—For pipe sewers and drains in Freeport St., from Beach St. to point about 311 ft. southeasterly Dorchester. Following bids were opened Dec. 11, 1914: Peter Bompiani Co., \$561.43; Martino De Matteo, \$645.20; John F. Lynch, \$646.20; James J. Conway, \$659.53; A. E. Daddario, \$686.89; Timothy Coughlin, \$774.70; Louis Balboni, \$818.80; M. H. Kelley, \$856.55; Anthony Baruffaldi, \$860.36. Contract was awarded to Martino De Matteo. Engineer's estimate, \$633.16.

Grosse Point, Mich.—For constructing trunk sewer along East Jefferson Ave., to William Sager, Saginaw, at \$86,000.

St. Paul, Minn.—As tabulated by Purchasing Agent August Hohenstein, low bids on sewer work submitted to Council are as follows: Sewer, Edmund St., Snelling Ave. to 1st St.; Fry St., Edmund to Charles, and Charles St., Fry to Aldine, Thornton Bros., \$3,957. Sewer, Minnehaha St., Avon to Victoria, Christ Johnson, \$1,003. Sewer, Marion St., Lawson to Geranium, Christ Johnson, \$2,125. Sewer, Sherburne Ave., Snelling Ave. to Fry St., Christ Johnson, \$862. Sewer, Abell St., Jessamine to Rose, Dougherty & Son, \$715. Sewer, Wakefield Ave., Maple to Forest, Thornton Bros., \$687. Sewer, Roy St., Shields Ave. to St. Anthony, Christ Johnson, \$680. Bids are uniformly below the estimate.

Albany, N. Y.—To Katteux & DeNallo, 841 Albany St., Schenectady, at \$9,490, for construction of sewers.

Utica, N. Y.—Frank Cafarelli has been awarded contract for construction of sewer in Oak St. by Board of Contract and Supply. He was the lowest of half a dozen bidders, who submitted figures. The proposals received were as follows: A. W. Fitch, \$577.05; John R. Baxter, Jr., \$651.60; F. M. Johnson, \$604.52; Domenick Perritane, \$653.05; Frank Cafarelli, \$510.30, and Martin McManus, \$607.80.

Lawton, Okla.—By city to Mayfield & Shaw, Fort Bliss, Tex., for construction of sewer to cost \$27,700. Frank B. King is engineer in charge.

Philadelphia, Pa.—By Dept. of Pub. Wks. to Jos. Perna, 334 N. 65th St., Philadelphia, for constructing main sew-

ers at 52d St. and Grays Ave., at \$28,600. Geo. S. Webster is Ch. Engr. and Surveyor, Room 412, City Hall.

West View, Pa.—For constructing 1,550 lin. ft. length of tunnel, 1,250 cu. yds. inside excav., 5,470 ft. 20, 15 and 12-in. t. c. pipe sewer, etc., to M. O'Herron Co., Pittsburgh, at \$16,528. Other bids are as follows: Booth & Flinn, Pittsburgh, \$18,124; Frank Mannella, Pittsburgh, \$19,250; J. E. Welland & Co., Pittsburgh, \$23,887. C. A. McClain is Boro. Clk.

Sioux Falls, S. D.—For construction of lateral sewer on 1st Ave. from 11th St. to 13th St. to Fanebust Bros. at \$668.

Seattle, Wash.—For construction of sewers on 37th Ave. South to Harbor Paving Co. at \$31,262.29.

Leamington, Ont.—To Webster Construction Co., Ltd., 68 Bank of Toronto Bldg., London, Ont., at \$25,000, for construction of Selkirk drain and branches.

WATER SUPPLY

La Mesa, Cal.—Bids will be received by President Board of Trustees Charles Samson until Jan. 8 for water and fire bonds in sum of \$8,100.

Seabreeze, Fla.—Pursuant to unanimous action taken by Town Council of Seabreeze Mayor has issued call for special municipal election to be held at town hall in Seabreeze, Volusia county, on Dec. 30, on question of whether Town Council of Seabreeze shall be authorized to issue negotiable bonds in sum of \$15,000 payable in 30 years, proceeds to be used in constructing, maintaining and operating waterworks system for supplying water for domestic and fire protection purposes.

Paris, Ill.—Election has been carried in favor of issuing reservoir bonds in sum of \$90,000. J. C. Riedel is City Clerk.

South Bend, Ind.—Several bids have been received by board of public works for new pumping engine for east end station. They were opened by City Clerk George Nutt and it was found figure at which firms offered to provide the engine varied from \$10,450 to \$14,470. Bids were referred to Supt. A. R. Kline for tabulation.

Crawfordsville, Ind.—City Council is considering petition to submit to voters proposition to issue water works bonds in sum of \$10,000.

Larned, Kan.—City council has ordered that bids be advertised for letting of contract for new municipal water and light plant. City voted \$90,000 worth of bonds to be used for that purpose at election last spring.

Newton, Kan.—At meeting of the City Commission Mayor A. J. Duff, as head of water department, was authorized to make preliminary arrangements for sinking of new well with view of at least doubling water supply at city pumping plant at Mission.

Sehree, Ky.—At last meeting of City Council Mayor was authorized to advertise for bids on \$14,000 worth of city bonds, which will be sold at next regular meeting, which will be January 4. These bonds will be sold for purpose of installing water works system for city.

Boston, Mass.—For laying water pipes in Vesper St., West Roxbury; Cameron St., Dorchester; Berwick St., Boundary Rd. and Vernon St., Hyde Park, following bids were opened Dec. 16, 1914: R. Cartullo, \$1,859; Peter Bombiani Co., \$1,954; John Guarino, \$1,977; Louis Baldoni, \$2,012; John F. Lynch, \$2,141; M. De Siston, \$3,302.52; John T. Shea, Jr., \$4,098.50.

Haverhill, Mass.—Citizens of town of Salisbury have voted to enter into contract with Artesian Water Co. for water system which will furnish water to village and beach for both fire and domestic purposes. Contract calls for 58 fire hydrants and system is to be completed by July 1 next.

Methuen, Mass.—Town Council has voted to issue 4½ per cent. water main extension bonds in sum of \$8,000.

North Adams, Mass.—The Williams-town Water Co. has decided to adopt meter system of determining what consumers shall pay company for water and it is expected that in another year new system will be in use. Company has already begun work of installing meters, but it will take some time to complete work and change will not be made until system is nearer completion.

Salem, Mass.—City Council has voted to petition legislature for authority to construct new reservoir and new 36-in. mains from Wenham lake through Peabody and Danvers, at cost of \$400,000 to be paid by bond issue to run 40 years and be outside debt limit.

Brookston, Minn.—Election has been carried in favor of issuing water works bonds in sum of \$3,850.

St. Paul, Minn.—Garrett O. House, superintendent of water service, has asked Council to authorize employment of Allen Hazen to make report on water situation in St. Paul and advise whether building of two new reservoirs and treatment of water would remove algae. Matter was referred to Mr. House and the corporation counsel.

Edina, Mo.—Election has resulted in favor of issuing water bonds in sum of \$20,000.

Billings, Mont.—On Dec. 29 City Clerk E. L. Torrance will sell at public auction issue of 5 per cent. water bonds in sum of \$450,000.

Lodi, N. J.—Water Engineer Cody has requested purchase of 24 trident ½-in. meter bottoms and gaskets. The fire and water committee has been authorized to purchase them.

Barker, N. Y.—Another special election will be held for voting on establishing water system to cost about \$30,000.

Middletown, N. Y.—Resolution has been adopted providing for construction of 20-in. cast iron water main for distance of 6,000 ft. toward filter plant, to connect with old main 2,500 ft. from filter plant.

Mt. Morris, N. Y.—Appropriation of \$20,000 has been made to complete paying for bringing of Silver Lake water to village. Also proposition 2 to install new water system for \$65,000 has been carried by majority of 67.

Mt. Morris, N. Y.—Village will vote on \$150,000 expenditure for water works and sewerage plants.

Southport, N. C.—The Southport Board of Aldermen have instructed by unanimous vote the mayor and city clerk to sign a \$43,000 water and sewerage contract with an Atlanta concern.

Wilmington, N. C.—Authority to have water waste survey made early in new year should he deem it necessary has been granted to Councilman C. C. Loughlin, in charge of water and sewerage department. Survey will cost \$1,260.

Brewster, O.—Village Clerk L. S. Lash will receive bids until Jan. 2, at noon, for the following coupon bonds: Water works, \$21,000, and sanitary sewer system, \$16,000.

Brewster, O.—Council has advertised in New York papers sale of \$37,000 worth of bonds to raise money for municipal water and sewage disposal plants.

Covington, O.—The Covington City Commissioners have enacted ordinance providing for extension and re-enforcement of Covington water works system along Rogers St. in South Covington.

Dayton, O.—R. L. Day & Co., of Boston, has purchased water works bonds in sum of \$90,000.

Lima, O.—Legislation probably will be enacted by City Council at its next meeting, Dec. 21, providing for bond issue of \$65,000 to repair and strengthen upper city reservoir and to drill wells for emergency supply. It is estimated that improvement will increase capacity of reservoir from 325 million to 525 million gallons.

Middletown, O.—Pollard and Elms, professional hydraulic engineers, employed by city for surveys and expert advice on water works situation in this city, have sent a communication to city relative to installation of new boiler at water works station, saying that one 200-horsepower boiler was advisable and that plans will be prepared for it if instructions are given.

Pataskala, O.—Special election will be held Dec. 21 for voting on the question of issuing water works bonds in sum of \$25,000.

Springfield, O.—Plans have been prepared to extend water service to residents of Middle St., between Warder and Nelson. If funds will permit, department will next lay extensions in James St. from Edwards to Belmont.

Kiefer, Okla.—City will vote on question of issuing water works construction coupon bonds in sum of \$60,000.

Redrock, Okla.—Town will take steps in near future for construction of water works and electric light system. At meeting of Board of Trustees on December 24th, the Benham Engineering Co., of Oklahoma City, Okla., were retained as consulting engineers to draw up plans and specifications and supervise construction of system of water works and electric lights. It is very likely that

bonds will carry at election to be held for that purpose, as people are in favor of project. Probable amount of bond issue \$30,000.

Philadelphia, Pa.—High pressure mains in South Philadelphia is being discussed.

Dresden, Tenn.—City has voted \$15,000 in bonds for proposed water works system. W. W. Fuller is city recorder.

Denison, Tex.—See "Miscellaneous."

El Paso, Tex.—City will construct water main to new county hospital.

Escalante, Utah.—Realizing need of improvement in sources of water supply, town of Escalante, of less than 1,000 population, soon will begin construction of \$45,000 water system.

Provo, Utah.—The Orem Townsite Co. is making investigation of feasibility of organizing water works company for residents of Provo bench and Lindon, with object of supplying residents in those districts with good spring water for domestic and culinary purposes. Water for this purpose probably would come from Steele Farm, near Heislets, in Provo Canyon, where number of springs are located. Townside firm has 7,000 ft. of 12-in. pipe on the ground.

Dayton, Va.—See "Sewerage."

Anacortes, Wash.—City is contemplating question of issuing water system bonds in sum of \$150,000.

Harlowton, Wash.—Installation of city water works capable of supplying 45 lbs. pressure and delivering 250 gals. a minute from 1½-in. nozzle has been voted for. Gerharz-Jaqueth Engineering Co., Great Falls, Mont., is engineer.

Morton, Wash.—Proposition of issuing \$5,000 in bonds for taking over water system has been carried.

Tacoma, Wash.—Plans have been started for construction of water system and fire fighting system for Point Defiance Park which will cost about \$25,000. G. L. Gower is secretary of Metropolitan Park Board.

New Richmond, Wis.—New Richmond has sold its \$12,000 bond issue for water works construction at home. John E. Glover of this place was awarded entire issue.

CONTRACTS AWARDED.

Escondido, Cal.—To Holland Construction Co., San Diego, at \$11,494 for construction of 1,500,000-gal. storage reservoir of municipal water system on Park Hill. John M. Gardiner Co., Los Angeles, has been given contract for laying of 16 miles of iron pipe for \$55,000.

Berwyn, Ill.—To Chas. M. Porter Co., 118 N. La Salle St., Chicago, for laying of cast-iron water supply pipe for \$3,516.

Cuba, Ill.—By Board Local Improvements, to Monie & Dunbar, of St. Louis, Mo., for water distributing system, at following bid: 27,968 ft. 4-in. pipe and specials, per ft. 42.7c.; 5,232 ft. 6-in., 57c.; 1,200 ft. 8-in., 77c.; 35 4-in. gate valves and boxes, each \$10.50; 10 6-in., each \$14; 2 8-in., each \$19; 62 hydrants set, each 50c.; total, \$16,425. Next three lowest bids: F. H. Woolcox, Oglesby, \$16,488; M. McElligott, Evanston, \$16,954; A. D. Thompson, Peoria, \$17,980. Plans by Fuller Coult Co., St. Louis, Mo.

Douglass, Kan.—Contract has been awarded to O'Neil Const. Co., Leavenworth, Kan., at \$10,995, for furnishing and laying 18,000 ft. 4 in. c.-i. pipe, 3,000 ft. 6-in. c.-i. pipe; 28 Ludlow hydrants; 28 valves and 60,421 lbs. casting. C. A. Ogg is clerk.

Baltimore, Md.—To C. B. Clarke & Co., of Baltimore, at \$67,417 contract for reinforced lining in Gunpowder Tunnel, known as Contract No. 37.

Baltimore, Md.—The Whiting-Turner Co. has secured contracts for building large water main from Lake Clifton to Oak St., connecting up new filtration plant at Lake Montebello with Mount Royal pumping station. Bid was \$180,977.85. Contract for erecting new upper service pumping station to supply North Baltimore at the Pimlico entrance to Druid Hill Park was awarded to the D. M. Andrew Co., which offered to do work for \$15,550.

Detroit, Mich.—By Water Board to American Car & Fdy. Co., Detroit, for 25,000 tons c.-i. pipe, at \$21.45 per ton.

Eveleth, Minn.—For construction of water line contract has been awarded to Lawrence McCann Co. at \$1,364.

New York, N. Y.—For laying water mains in Third, Madison and Park Aves. and in E. 42d and E. 53d Sts., to Beaver Engineering & Construction Co., at \$10,087.

Oregon City, Ore.—Contract for construction of South Fork Water System

for Oregon City, Ore., was, by vote of Commission on Dec. 14, awarded to Oregon Engineering & Construction Co. of Oregon City, pipe to be made by Willamette Iron & Steel Works of Portland. Contract price is \$315,000, payment to be made in Oregon City 5 per cent general municipal bonds which contractor has agreed to take at 90. Anything over this amount which may be realized will be refunded to city, i.e., the contractor has assumed a value of 90 in arriving at contract price as given above. The principal items in the contract are as follows: 40 acres clearing right-of-way at \$200—\$8,000; 2,000 c. y. solid rock exc., open cut, \$1.50—\$3,000; 4,300 c. y. solid rock exc., in trench, \$4.50—\$19,350; 12,600 c. y. loose rock exc., \$1.00—\$12,600; 4,000 c. y. cemented gravel exc., 75 cts.—\$3,000; 32,600 c. y. earth exc., 40 cts.—\$13,040; 80 c. y. wet exc., \$3.00—\$240; 840 lin. ft. 4x6-ft. tunnels, \$6.50—\$5,460; 68,500 lin. ft. 19-in. riveted steel pipe, 3/16-in. plates, long seams double riveted, national coated, in place, \$1.68½—\$115,422.50; 62,200 lin. ft. 17-in. same as above, \$1.53½—\$95,477; 2,300 lin. ft. 17-in. ¼-in. plates, in place, \$1.93½—\$4,450; headworks, including small dam and settling basin, valves, blow-offs, special castings, etc., \$34,960; total, \$315,000. Construction of reservoir deferred. Contract is subject to approval of voters, but dissatisfaction of people with present filtered supply which is pumped from Willamette River seems to indicate that decision on part of electorate will be favorable. Work is to be commenced as soon as possible and is to be completed in one year. H. A. Rands, of Oregon City, is the engineer, and J. L. Stannard, 814 Lewis Bldg., Portland, is consulting engineer of the project. Following are bids received Nov. 28: Wood pipe—Robert Wakefield, \$254,021.75; W. H. Mitchell, \$244,367.80; P. E. McHugh, \$219,034.83; Grant Smith & Co., \$262,737.45; J. F. Shea, \$263,546.45; James Kennedy, \$247,653.50; Consolidated Con. Co., \$221,100.31; Reliance Cons. Co., \$256,806.85; Pacific Bridge Co., \$209,770.45; Twohy Bros., \$236,777.95; Boyajohn-Arnold Co., \$241,996.90; Jacobson-Blade Co., \$256,884.40. Lap weld steel pipe—Robert Wakefield, \$385,936; Grant Smith & Co., \$437,401.50; Oregon Engineering & Cons. Co., \$307,348; J. F. Shea, \$463,303.60; Pacific Bridge Co., \$338,112; Twohy Bros., \$422,192.25; Boyajohn-Arnold Co., \$407,471. Riveted steel pipe—Grant Smith & Co., \$421,830.50; Oregon Engineering & Cons. Co., \$315,007; James Kennedy, \$383,810; Pacific Bridge Co., \$338,117; Twohy Bros., \$390,384.50; Boyajohn-Arnold Co., \$383,028. Open reservoir—Robert Wakefield, \$49,033.60; W. H. Mitchell, \$44,424.00; P. E. McHugh, \$47,871.55; Grant Smith & Co., \$57,832; Oregon Engineering & Cons. Co., \$35,367; J. F. Shea, \$49,114.50; Jas. Kennedy, \$49,720.50; Consolidated Con. Co., \$43,622.10; Reliance Cons. Co., \$41,634.85; Pacific Bridge Co., \$34,224; Twohy Bros., \$43,137.55; Boyajohn-Arnold Co., \$42,550.50; Jacobson-Blade Co., \$44,627.50. Closed reservoir—W. H. Mitchell, \$86,780.50; P. E. McHugh, \$92,817.40; Grant Smith & Co., \$137,392; James Kennedy, \$91,368.50; Pacific Bridge Co., \$78,755.50; Twohy Bros., \$99,757.50; Boyajohn-Arnold Co., \$77,298.

New Boston, Tex.—For installing a water system, to E. L. Dalton, Dallas, at \$9,925.

LIGHTING AND POWER

Phoenix, Ariz.—Installation of ornamental street-lighting system on North Central Ave. is being considered.

Pasadena, Cal.—On recommendation of Commissioner of Public Works T. D. Alin it was decided to install new lights on North Michigan and Sierra Bonita Aves.

Sacramento, Cal.—Plans for new system of illuminating the principal streets exposition year are to be worked out by City Engineer W. M. Rumsey, according to an order of the council. Plans for installation and estimates of cost of installation and maintenance are to be supplied council by engineer. They will call for system of electric arches at intervals on Broadway from Santa Fe station to 24th St. and on 5th St. from F to Laurel. According to their estimates, installation will cost about \$5,000 and that of maintenance would be \$600 a month, making total cost \$12,200.

Stockton, Cal.—The Western States Gas and Electric Co. was only concern submitting bids for lighting of streets and public offices of city of Stockton for year 1915, and while bids were taken under advisement, proposition submitted

by company will no doubt be accepted. Bids for street lighting from Jan. 1 to Dec. 31, 1915: First 200 lamps installed, \$62.50; all over 200 lamps installed, \$58.50. On basis of 600 lamps, price per lamp per year will amount to \$59.83. Bid covering period from Jan. 1, 1915, to Dec. 31, 1919: First 200 lamps installed, \$59.50; all over 200 lamps installed, \$55.50. On basis of 600 lamps, price per lamp per year will amount to \$56.85. Certified check for \$17,050, or 10 per cent. of the amount due at the end of the period, accompanied the bid. Bid on basis of a three-year contract: Price per electroliner pole per year, \$37.20. Bid on five-year contract, 120 poles: Price per electroliner pole, \$34.45. The electroliner is to be equipped with five lamps, the top one being 60-watt tungsten lamp, with four bottom lamps of 40-watt tungsten. For lighting and maintaining ornamental lamp poles, one 100-watt tungsten lamps, \$15. Furnishing of lighting in public buildings and offices, 3c. net per kilowatt-hour, with minimum monthly guarantee of \$1.

New Springfield, Fla.—New system of street lighting is being discussed.

Pablo Beach, Fla.—Electric light bonds in sum of \$10,000 will be sold at noon, Jan. 14, 1915, by bond trustees.

Wadley, Ga.—Special election will be held Dec. 21 for voting on question of issuing light plant bonds in sum of \$6,400.

Indianapolis, Ind.—The bids submitted by the Indianapolis Light and Heat Co., and Merchants' Heat and Light Co., for contract of supplying court house, jail and jail residence with heat, light and power, have been rejected by Board of County Commissioners on ground that they were not regular.

Santa Clara, Ore.—A movement is under way here to secure extension of lighting and power wires out river road as far as Santa Clara and Irving.

Peru, Ind.—Broadway and Main St. will be lighted with cluster lights.

West Bend, Ia.—Election has resulted in favor of issuing electric light bonds in sum of \$11,000. P. F. Calligan is Town Clerk.

Emporia, Kan.—The Emporia Gas Co.'s proposition to city for gas white way on Fifth Ave., between Mechanic and Merchant Sts., will be submitted to City Commissioners.

Larned, Kan.—See "Water Supply."

Saginaw, Mich.—Petition is being considered asking Council to call special election Feb. 23 for voting on bond issue of \$750,000 to build and equip a lighting plant and necessary distribution system for current.

Maxwell, Neb.—Election has resulted in favor of issuing light bonds in sum of \$7,000. E. J. Eames is Village Clerk.

Richmondville, N. Y.—At a special village election it was voted to have an all night electric light service and to spend \$2,000 to widen Railroad Ave. and Summit St., when new State road is built next year.

Poland, N. Y.—Cold Brook village and Poland village are considering erection of joint electric light plant.

Poughkeepsie, N. Y.—Plans are being discussed by merchants on Academy St. for installing new lamps on that thoroughfare from Main St. to Cannon St.

Dayton, O.—Petitions are being circulated asking for boulevard lighting system on Wilkinson St. from Fourth to Second; Second, from Wilkinson to Ludlow; Ludlow, from Second to First; First, from Ludlow to St. Clair, and Jefferson, from Second to First.

Toledo, O.—Resolution has been adopted for lighting additional streets with electricity.

Redrock, Okla.—See "Water Supply."

Baker, Ore.—Election will be called shortly for voting on municipal light plant.

Baker, Ore.—Submission to taxpayers of Baker of proposal to issue \$180,000 in bonds for installation of municipal lighting plant has been assured by receipt of report from J. L. Stannard, electrical engineer of Portland, that plant could be built at figures as estimated by L. R. Stockman, engineer originally employed to prepare estimates.

Harrisburg, Pa.—Public Service Commission has ruled that Borough of Gettysburg could build and operate its own electric plant to furnish light for its streets without obtaining consent of Commission.

Kutztown, Pa.—At citizens' meeting, residents of Kutztown unanimously decided to erect a \$23,000 municipal electric plant.

Punxsutawney, Pa.—Consulting Engineer Ewoboda who was employed by

Council to draw up plans and specifications for standards to be used in newly planned system of lighting Main St., has announced that plans are ready. Bids will be advertised for at once, and contract for installing standards will be let on January 8th. Standards are to be of metal, painted dark green, and will have five lights of 100 candle power each. Each column will be set in concrete circle raised 6 ins. above street level.

East Providence, R. I.—The Narragansett Electric Lighting Co. has been given permission to install new nitrogen street lamps in town system by Town Council.

Allendale, S. C.—By city, to R. L. Adershold, of College Park, Ga., to construct water works. Work consists of 75,000 to 100,000-gallon tower and tank and reinforced concrete reservoir with concrete cover, etc. H. S. Jaudon Engineering Co. is engineer, Savannah, Ga.

Dallas, Tex.—One bid, that of Dallas Electric Light & Power Co., for city street lighting contract has been received by Board of City Commissioners and referred to committee of the whole. Company offered to light city at same rate now charged, \$56 per light. As city has 1,300 lights, this would make contract worth \$72,800 annually, or \$218,400 for period covered by contract, but lights are being added constantly and total outlay will be larger.

Dayton, Va.—See "Sewerage."

Tacoma, Wash.—City Clerk will call for bids for furnishing and installing new luminous arc lamps in North End district of city. Council is also considering question of removing all poles and wires on Union Ave., South Tacoma, from 52d St. to 58th St., and installing luminous arc lamps.

Newmarket, Ont., Can.—City will vote Jan. 14 on question of issuing hydro electric plant improvement bonds in sum of \$15,000.

CONTRACTS AWARDED.

Indianapolis, Ind.—The Merchants' Heat and Light Co. has closed contract with Westinghouse Electric & Manufacturing Co., of East Pittsburgh, Pa., for 2,680 new electric street lamps, 30 regulating devices and 30 switchboards, to be part of its equipment for carrying out street lighting contract recently entered into with city. Lamps are of kind known as white flaming arc type, and have lighting capacity from lower hemisphere of their globes, which is part of light that goes downward, of 1,400-candle power each. Lamps are to be black enameled, of modern design, and first deliveries will be made in Indianapolis within four weeks.

Goldfield, Nev.—By City Council, contract for lighting streets of city to California-Oregon Power Co., of San Francisco, for period of ten years. Contract provides for installation of 18 3-cluster lamps, 35 single lamps on wooden posts and 16 lamps on iron standards and one large 3-lamp cluster at bridge.

Bridgeton, N. J.—By City Council, contract with Bridgeton Electric Co. for lighting streets of city for period of five years. New contract provides for ornamental lighting system in business district and for many additional lamps.

Sandusky, O.—By City Council to Sandusky Gas & Electric Co. contract for installation of ornamental street-lighting system in business district.

Tacoma, Wash.—Contract for pedestals for new lights has been awarded to Griffin Wheel Wks. for \$1,687. There will be 118 pedestals, stationed all along D St. from 7th St. to Jefferson Ave. Contract for cables and "cut-outs" was awarded to Western Electric Co. for \$2,700.

FIRE EQUIPMENT

Alameda, Cal.—The erection of central fire alarm station will be begun shortly at municipal electric plant. With building of structure will go renovation of lines of city and seven new alarm boxes will be installed. The Waterside Terrace and Fernside Blvd. tracts will be given alarm service under reorganized system.

Huntington Beach, Cal.—Another bond election is in prospect for Huntington Beach. Fire Chief H. T. Sundbye is circulating petition asking City Trustees to call election to vote on bonds to amount of \$6,500 to secure adequate fire protection for the city.

South Oak Park, Cal.—Extension of fire alarm system is asked for.

Bridgeport, Conn.—Complete motorization of Fire Department, installation of new signal system and building, and

erection of drill station have been included in annual requisition of \$384,386 decided upon by Board of Fire Commissioners.

Westport, Conn.—Installation of fire alarm system is being discussed.

Denver, Colo.—Bids will be called for shortly for furnishing motor pumping engine. Alexander Nisbet is commissioner of public safety.

South Bend, Ind.—Purchase of 85 ft. aerial truck is recommended.

Des Moines, Ia.—City is considering bond issue of fire department bonds in sum of \$20,000 in small lots to local investors.

Augusta, Me.—City officials are considering improvements, including the erection of a central station and the addition of motor apparatus. C. G. Hunt is Chief.

Cambridge, Mass.—Installation of an alarm system is being planned. N. W. Bunker is Chief.

Marblehead, Mass.—Board of Engineers are to ask for appropriation of \$6,000 at annual Town Meeting for purpose of purchasing new auto hook and ladder truck, which would complete motorizing of the active kit of local fire department.

Iron River, Mich.—Purchase of one piece of motor apparatus is contemplated. J. B. Henley is chief.

St. Louis, Mo.—Fifty non-freezing fire plugs will be installed in district bounded by 12th St. on west, river on east, Market and Washington Aves., Water Commissioner E. E. Wall has announced. Work of installation will start at once. It was decided to purchase plugs at cost of about \$3,000 at conference between Fire Chief Henderson and the water commissioner.

Omaha, Neb.—Bond issue may be made to cover cost of motor apparatus.

Bordentown, N. J.—Purchase of auto combination chemical and hose car is contemplated.

North Plainfield, N. J.—Combination hose wagon and pumping engine may be purchased in near future.

Riverton, N. J.—Purchase of piece of motor apparatus is being considered by members of companies.

West Hoboken, N. J.—Town Council has passed ordinance authorizing fire department bond issue in sum of \$4,500.

Binghamton, N. Y.—Bids will be advertised for 5,000 ft. of fire hose.

Manhasset, N. Y.—Citizens have authorized purchase of one piece of motor apparatus.

Norwich, N. Y.—Citizens will vote on question of appropriating \$4,000 for equipment. L. C. Brookins is Chief.

Norwich, N. Y.—Purchase of 5,000 ft. of hose has been recommended. L. C. Brookins is chief.

Canton, O.—Safety Director R. J. Kunkel will advertise for bids for triple combination. R. O. Mesnar is Chief.

Chester, Pa.—The Good Will Fire Co. has decided to purchase a triple combination wagon. Committee in charge consists of T. C. Burke, Jr., M. L. Plumley and Wm. Weir.

South Bethlehem, Pa.—Fire committee has advertised for bids and specifications for motor equipment of chemical apparatus of Fairview Hose Co. No. 1.

York, Pa.—Good Will firemen have decided to motorize both their chemical apparatus and steam fire engine.

East Providence, R. I.—Town Council is discussing equipping rear wheels of motor truck with double pneumatic tires.

Sioux Falls, S. D.—Representatives of three fire apparatus firms have submitted bids for furnishing Sioux Falls fire department with aerial hook and ladder automobile truck, with automatic extension ladders. Bids were as follows: The American-La France Fire Engine Co., of Elmira, N. Y., \$11,000, with 5 per cent. discount for cash 30 days after delivery. The Seagrave Co., Columbus, O., \$10,600. James Boyd & Bro., Inc., of Philadelphia, Pa., \$10,600, with special discount of \$500 to the city. Contract has not yet been awarded.

Norfolk, Va.—Many bids have been received by controllers for 1,800 ft. of 2½-in. rubber lined fire hose with coupling and 400 ft. of ¾-in. chemical hose, and have been referred to Chief McLaughlin, of fire department.

Warwood, W. Va.—Money has been appropriated for piece of motor apparatus and also for repairs to alarm system.

Oshkosh, Wis.—Motor truck will be purchased in near future.

CONTRACTS AWARDED.

Biloxi, Miss.—Contract for hose wagon has been awarded to O'Connor & Co., 518 Julia St., New Orleans. It will be used by Volunteer Steam Fire Co. No. 1.

Orange, N. J.—By unanimous vote

Orange Commission has awarded contract for motorizing city fire department to White Co., of Newark, at their price of \$18,450. From this sum will be deducted \$2,000, which automobile company has allowed for 14 horses now in use in headquarters, and Forest St. and Washington St. houses, making net total \$16,450.

Rochester, N. Y.—Board of Contract & Supply has awarded contracts for auto fire apparatus and a new motor patrol wagon. Contract for motor patrol wagon was awarded to James Cunningham & Son Co. for \$2,375. Contract for auto for Fire Marshal's office was awarded to Thomas J. Northway for \$472. The International Motor Co. was awarded contract for furnishing a two-ton chassis for combination wagon for Fire Department. The Seagrave Co., of Columbus, O., will furnish tractor for Truck 1 for \$4,700. A runabout for Public Works Department will be furnished by Thomas J. Northway for \$472. Two light auto trucks for the Water Works Department will be furnished by Overland-Rochester Co. at \$950 each. Contract for 3,000 ft. of 2½-in. hose for fire department was awarded to Eureka Hose Co., at \$1 a ft.

BRIDGES

Colusa, Cal.—Supervisors have sold Colusa county's 5 per cent. bonds of face value of \$150,000 at premium of \$2,750. They are long term bonds, being due from 1930 to 1942. They were sold to Anglo, London & Paris National Bank of San Francisco. Money is to be used for building bridges throughout Colusa county. Bonds for building river bridges at Grimes and Princeton are to be sold when Sutter and Butte counties are ready to subscribe their portion for building of these bridges, which will be joint county bridges.

San Francisco, Cal.—Construction of a footbridge across East St., to cost \$15,000, is being planned. Jerome Newman is engineer for harbor board.

Willows, Cal.—Supervisors have inspected proposed joint county bridge site at Princeton. Work on this structure which will span the Sacramento River will be started in early spring. Plans for bridge will be asked for at once. Colusa already has \$60,000 available for her share of work and Glenn county has smaller sum.

Wilmington, Del.—Levy Court has accepted bid from Harris, Forbes & Co., of New York, for \$150,000 bond issue for bridge improvements, money to be expended upon 3d St. bridge. Bid of concern was for par, or \$150,000 for entire issue.

Indianapolis, Ind.—City officials will sell bond issue of \$63,000 authorized by City Council for buying land needed in connection with the construction of new bridge across White River, at Washington St., and for doing some excavation work in connection with flood protection plans.

Anthony, Kan.—Bids will be received by Board of County Commissioners of Harper County until noon, Jan. 11, 1915, for construction of ten bridges, three of reinforced concrete and seven to be concrete roadways or low-water bridges. R. P. Chevraux is County Clerk.

Salina, Kan.—Board of County Commissioners has passed resolution appropriating \$26,000 for purpose of constructing cement bridge across Smoky Hill River at Iron Ave. City pays balance, amounting to \$4,000, which will be required to built \$30,000 bridge for which people voted a few months ago.

Vicksburg, Miss.—For constructing steel and concrete bridge over Big Black River to Vincennes Bridge Co., Vincennes, Ind., at \$9,708.

North Platte, Neb.—County Clerk C. W. Yost will receive bids until Dec. 28 at 5 p. m. for following registered bridge bonds: Bridge (city of North Platte), \$12,000; bridge (Platte Precinct), \$13,000.

New Brunswick, N. J.—Board of Chosen Freeholders of Middlesex Co. has requested county engineer to prepare plans for bridge to be erected at causeway over South River.

Beaver Falls, N. Y.—For constructing bridge over Beaver River to Groton Bridge Co., Groton, at \$5,112.

Cobleskill, N. Y.—Special election will be held Dec. 28 for voting on question of issuing bridge bonds in sum of \$13,500.

Newfane, N. Y.—City is discussing construction of \$20,000 bridge over Eighteen Mile Creek at Ide Road.

Riverhead, L. I., N. Y.—See "Streets and Roads."

Watertown, N. Y.—New bridge can be built at Court St. for \$40,000 according to estimate of City Engineer E. W.

Sayles made in connection with report on bridge which Mr. Sayles has submitted to Mayor I. R. Breen and which is first step in another agitation for new structure over Black River at that point and necessary bond issue.

Dayton, O.—Bridge repair bonds in sum of \$15,000 have been purchased by R. L. Day & Co., of Boston.

Youngstown, O.—At request of Judge Robinson City Engineer Lillie submitted plan prepared by him some time ago, under instructions from council, for building of bridge to Himrod Ave. Judge asked Engineer Little to redraw plans for this bridge according to ideas advanced by engineer himself without regard to instructions given by council.

Sapulpa, Okla.—Special election will be held shortly to vote on question of issuing bridge bonds in sum of \$100,000.

Eugene, Ore.—New bridge at Coast Fork on road to Pleasant Hill, is recommended.

Goldbeach, Ore.—County Commissioners have appropriated sum of \$6,000 for reconstruction of Elk River County bridge.

Portland, Ore.—Clarke County has sold remainder of its issue of bonds for construction of Interstate Highway bridge, which will link Vancouver with Portland. When definite information to this effect was received by Commissioners of Multnomah County sale of this county's \$1,600,000 of bridge bonds, which had been made earlier in the day, was ratified. The Portland Trust & Savings Bank was high bidder for Clarke County's \$250,000 issue, proposing to pay premium of \$1,950 for entire lot.

Philadelphia, Pa.—The Delaware River Bridge Committee are urging construction of bridge to connect this city and Camden, N. J.

Woonsocket, R. I.—See "Miscellaneous."

Spartanburg, S. C.—Blue print plans for concrete overhead bridge on North Church St. will be drawn and submitted to City Commissioners for ratification within a very short time.

Denison, Tex.—See "Miscellaneous."

Smithville, Tex.—The \$50,000 bridge bond issue that was voted last spring has been sold to Cincinnati parties. This insures completion of Colorado River bridge that has been under construction past six months.

CONTRACTS AWARDED.

Santa Ana, Cal.—Ten bids have been received for building six concrete bridges in Santa Ana canyon. Contract went to Frank K. Benchley, of Fullerton, on his bid of \$3,190. Other bids were: George Wiegand, \$6,860; C. E. Reed, \$7,450; Easley Construction Co., \$6,425; C. McNeill, \$5,795; J. Driscoll, \$5,850; Richard Rothwell, \$7,000; Bert Noble, \$4,045; Andrew Holloway, \$4,900; Hart & Ducey, \$4,800; C. W. Cobarley, \$3,877; Oscar Ford, \$6,300; J. S. Fuller, \$4,998; Mercereau Bridge & Construction Co., \$6,969; J. S. Hilend, \$5,632; Engwell Slayton Co., \$3,485.

Sacramento, Cal.—Contract for construction of bridge across Dark Canyon, on Yankee Hill-Las Plumas Rd., has been awarded to Chico Construction Co. for \$1,449, half of which expense is to be borne by Great Western Power Co. and half by county.

Hartford, Conn.—By State Highway Commission for removing bridge from one location to another in Old Lyme Township, and constructing wing walls, abutments, etc., to D. F. Toomey, South Norfolk, at \$7,842.

Marquette, Mich.—By City Council for construction of 60-ft. bridge over Carp River at Lake St. to Worden-Allen Co., Milwaukee.

Northfield, N. J.—By Board of Chosen Freeholders of Atlantic County contract for bridge over English Creek, on road from Northfield to Mays Landing, to Geo. Hauselman, Cologne, N. J., at \$3,729. Other bidders were: J. W. Ingersoll, \$3,950; H. H. Smith, \$5,340; Reilly Bros., \$4,790; John E. Kahle, \$7,489, and Lay & Eastwood, \$5,631.

Tulsa, Okla.—By Tulsa County Commissioners, to Canton Bridge Co., Canton, O., for construction of bridges Nos. 125, 126 and 128, at \$4,273, \$1,257 and \$792 respectively, and to Orgonia Co., of Oklahoma City, bridges Nos. 125 and 127, at \$4,273 and \$500 respectively.

Pawtucket, R. I.—For repairing of Harris bridge to John F. McCusker at \$1,000.

Chattanooga, Tenn.—To Vang Construction Co., of Cumberland, Md., at \$342,491, for concrete work on Market St. bridge; also to Mark K. Wilson, of Ridgedale, Tenn., to construct concrete arch approaches at about \$28,000; B. H. Davis is Consulting Engineer, Whitehall Building, New York.